

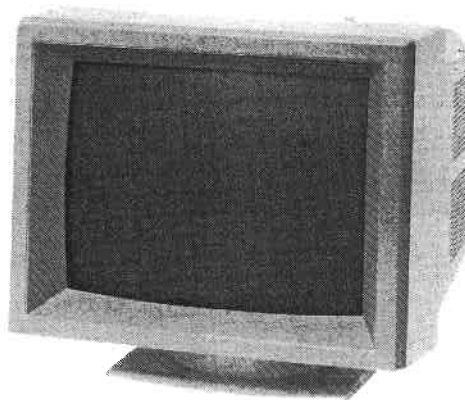
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NEC**MODEL JC-1401P3A****MULTISYNC COLOR MONITOR
SERVICE MANUAL**

PART NO. 599910248



**Better Service
Better Reputation
Better Profit**

**SPECIFICATIONS****A. Electrical Description**

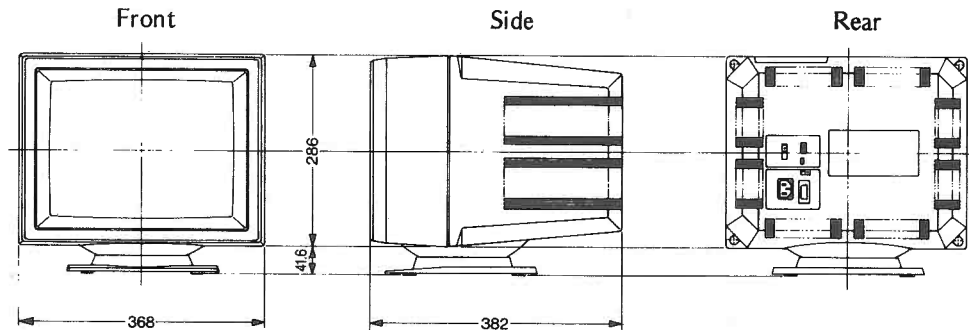
Picture Tube	370HYB22 13 Visual inches diagonal 90 degree deflection, 0.31 mm Trio dot pitch Dot type black matrix, Non-long persistence phosphor, Dark bulb, Direct etch	Misconvergence	Less than 0.6mm			
Input Signal	Video : TTL Level Positive : ANALOG 0.6Vp-p/75Ω Positive Sync. : Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative : Composite sync. TTL Level Positive/Negative : Composite sync. on Green Video sync. 0.3 Vp-p Negative (Video 0.6 Vp-p Positive)	Power Supply	AC 120V, 60 Hz			
		Power Consumption	76 W			
		Environmental Considerations	*Operating	Temperature	0°C to +40°C	
				Humidity	30% to 80%	
			Storage	Temperature	-20°C to +60°C	
			Humidity	10% to 90%		
Display Colors	TTL Input : 8/16/64 colors Analog Input : Unlimited colors	NOTE: The above specifications are subject to change without notice for further improvement.				
Synchronization	Horizontal : 15.5 KHz to 35 KHz (Automatically) Vertical : 56 Hz to 62 Hz (Manual), Non-interlace					
Resolution	Horizontal : 800 dots Vertical : 560 lines					
Video Band Width	30 MHz					
Active Display Area	Horizontal : 250mm Vertical : 180mm					

NOTE: The above specifications are subject to change without notice for further improvement.

NEC Corporation

B. Mechanical Description (See below diagrams)

- | | |
|----------------|--|
| 1. Cabinet: | Molded plastic cabinet with attachable tilt swivel base. |
| 2. Dimensions: | 368(W) x 327.6(H) x 382(D) mm |
| 3. Weight: | 15.2 kg |



4. Controls

Rear Controls:

Power Switch
Manual Switch
Color Switch
Text color Switch
TTL/ANALOG Switch

Top Controls:

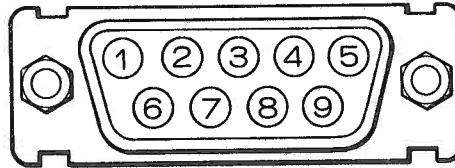
Brightness Control
Contrast Control
V. Size Control
V. Position Control
V. Hold Control
H. Position Control
Text Switch
H. Width Switch

5. Input Signal Terminal:

9 Pin D-Sub Connector (female)
(See Page 2 for Pin Assignments)

PIN ASSIGNMENTS AND SIGNAL LEVELS

D-SUB Type 9P



PIN ASSIGNMENT OF IBM GRAPHICS ADAPTER

IBM ADAPTERS PIN- ASSIGNMENT	COLOR GRAPHICS TTL 16 COLORS	ENHANCED GRAPHICS TTL 64/16 COLORS	PROFESSIONAL GRAPHICS ANALOG
1	GROUND	GROUND	* RED
2	GROUND	SECONDARY RED	* GREEN
3	RED	PRIMARY RED	* BLUE
4	GREEN	PRIMARY GREEN	COMPOSITE SYNC
5	BLUE	PRIMARY BLUE	MODE CONTROL
6	INTENSITY	SECONDARY GREEN /INTENSITY	RED GROUND
7	NON-CONNECTION	SECONDARY BLUE	GREEN GROUND
8	HORIZONTAL SYNC.	HORIZONTAL SYNC.	BLUE GROUND
9	VERTICAL SYNC.	VERTICAL SYNC.	GROUND

PIN ASSIGNMENT OF OTHER COMPUTERS

SIGNAL PIN- ASSIGNMENT		TTL			ANALOG		
		8 COLORS	16 COLORS	64 COLORS	SEPARATE SYNC.	COMPOSITE SYNC.	SYNC. ON GREEN
1	GROUND			* RED			
2	——		SECONDARY RED	* GREEN		GREEN ⊗ H/V SYNC	
3	RED		PRIMARY RED	* BLUE			
4	GREEN		PRIMARY GREEN	H. SYNC.	H/V SYNC.	——	
5	BLUE		PRIMARY BLUE	V. SYNC.	——		
6	——	INTENSITY	SECONDARY GREEN	GROUND			
7	——		SECONDARY BLUE				
8	H. SYNC./H/V SYNC.						
9	V. SYNC.						

“—” means GROUND or NON-CONNECTION

SIGNAL LEVEL

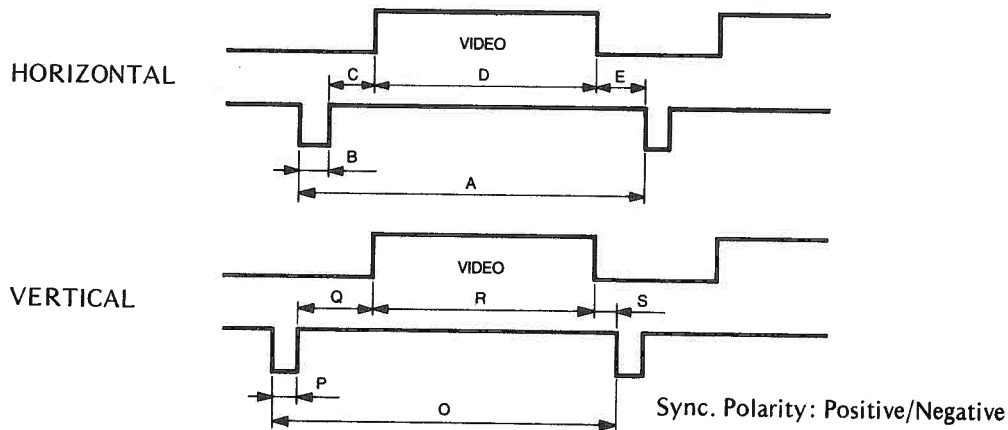
All signal levels, except for those listed below, are TTL.

“*” means 0.6 Vp-p (VIDEO)

“©” means 0.6 Vp-p (VIDEO), 0.3 Vp-p (SYNC)

TIMING CHART

SEPARATE SYNC.



	f_H	EXAMPLE TIMING			REMARKS
		15.75kHz	24.83kHz	30.1kHz	
Horizontal	$A_{\mu s}$	63.5	40.28	33.2	64.5 to 28.6 μs (15.5 to 35kHz)
	$B_{\mu s}$	5.08	3.04	3.43	2 to 10 μs
	$C_{\mu s}$	7.62	2.80	2.86	2 to 8 μs
	$D_{\mu s}$	46.3	32.4	25.76	20 to 48 μs *
	$E_{\mu s}$	4.4	2.04	1.14	1 to 6 μs and $E/(B+C) = 0.1$ to 0.45 Range 1: $E/(B+C) = 0.3$ to 0.5
Vertical	O_{mS}	16.6	17.72	17.66	16.1 to 17.8 mS (56 to 62Hz)
	P_{mS}	0.26	0.32	0.26	0.05 to 0.7 mS
	Q_{mS}	1.6	1.01	0.73	0.08 to 2.2 mS
	R_{mS}	13.84	16.11	16.6	12 to 17 mS and $(O-R) = 0.8$ to 4.0
	S_{mS}	0.9	0.28	0.066	0 to 1.6 mS and $Q = [(O-R)-0.8]/2 \pm 0.2$

Range 1: $A = 64.5$ to $50\mu s$

Range 2: $A = 50$ to $37\mu s$

Range 3: $A = 37$ to $28.6\mu s$

* Both SEPARATE SYNC. & COMPOSITE SYNC.

Range 1: $D/A = 0.7 \sim 0.75$

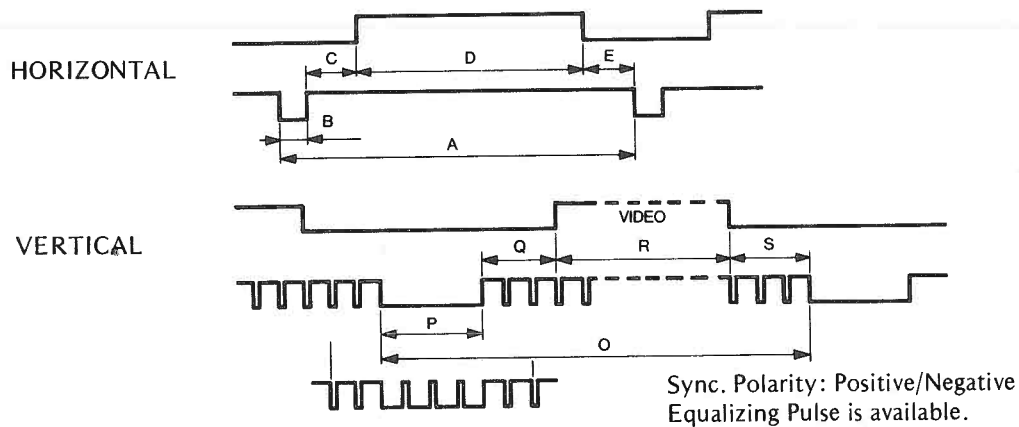
Range 2: $D/A = 0.8 \sim 0.85$

Range 3: $D/A = 0.75 \sim 0.8$

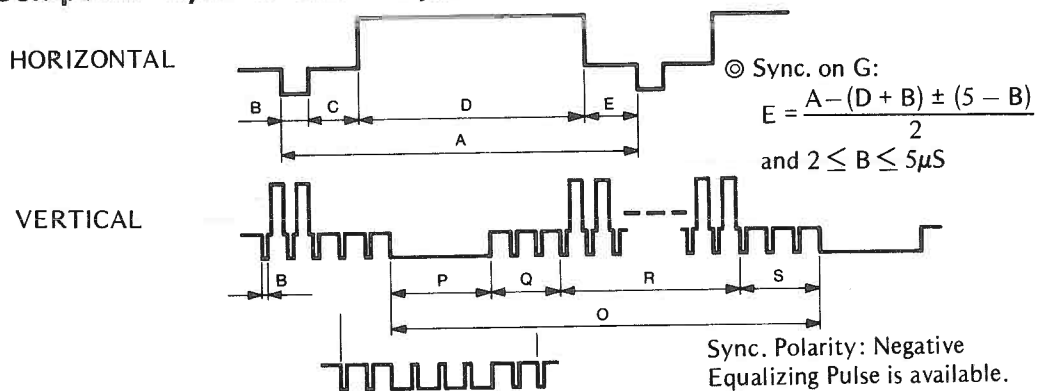
PRESET TIMING

Horizontal	f_H	15.8kHz	22kHz	30.5kHz	Vertical	f_H	15.8kHz	22kHz	30.5kHz
	$A_{\mu s}$	63	45.5	33		O_{mS}	16.4	16.68	16.6
	$B_{\mu s}$	4.2	4.9	4.5		P_{mS}	0.075	0.6	0.07
	$C_{\mu s}$	7.2	1.6	2.8		Q_{mS}	1.525	0.08	2.12
	$D_{\mu s}$	45	39	25.6		R_{mS}	12.6	16	13.05
	$E_{\mu s}$	6.6	0	0.1		S_{mS}	2.2	0	1.36

COMPOSITE SYNC.



Composite Sync. & Video (Sync. on Green)



	f_H	EXAMPLE TIMING			REMARKS
		15.98kHz	25.5kHz	31.5kHz	
Horizontal	$A_{\mu s}$	62.6	39.2	31.75	64.5 to 28.6 μs (15.5 to 35kHz)
	$B_{\mu s}$	5.41	2.51	2.06	2 to 10 μs
	$C_{\mu s}$	8.0	3.30	3.62	3.3 to 8 μs
	$D_{\mu s}$	44.7	32.14	24.52	20 to 48 μs *
	$E_{\mu s}$	4.47	1.25	1.56	1 to 6 μs and $E/(B+C) = 0.1$ to 0.45 Range 1: $E/(B+C) = 0.3$ to 0.5 ⊙
Vertical	O_{mS}	16.35	16.67	16.67	16.1 to 17.8 mS (56 to 62Hz)
	P_{mS}	0.19	0.12	0.19	0.05 to 0.19 mS
	Q_{mS}	1.82	0.80	1.02	0.8 to 2.2 mS
	R_{mS}	13.47	15.63	15.24	12 to 17 mS and $(O - R) = 0.8$ to 4.0
	S_{mS}	0.87	0.12	0.22	0 to 1.6 mS and $Q = [(O - R) - 0.8]/2 \pm 0.2$

GENERAL

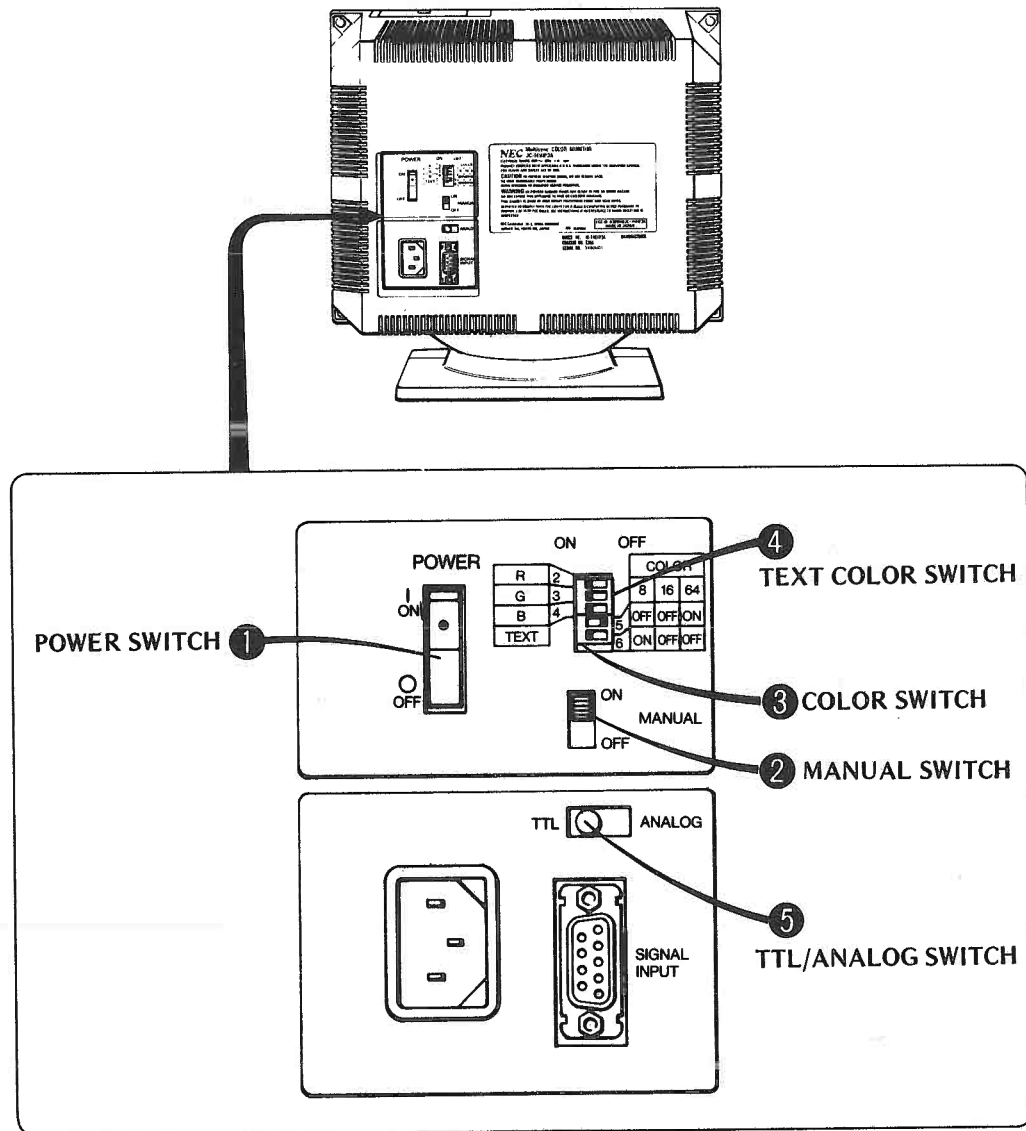
MultiSync, The Intelligent Monitor, is a high resolution color monitor that automatically adjusts to graphics board scanning frequencies from 15.5 KHz to 35 KHz.

MultiSync gives IBM PC, PC/XT, and PC/AT users crisp text and vivid color graphics displays when used with any of the three IBM graphics adapters (the CGA, EGA or VGA)

MultiSync can also be used with other IBM compatible graphics adapters to provide IBM users with the widest range of color monitor compatibility and capability available in the market place.

FEATURES

- MultiSync automatically scans all frequencies between 15.5 KHz and 35 KHz.
- MultiSync is compatible with the IBM PC, PC/XT, PC/AT and look-alikes.
- MultiSync is compatible with the IBM Professional Graphics Adapter, the IBM Enhanced Graphics Adapter, the IBM Color Graphics Adapter and other IBM compatible graphics adapters.
- MultiSync's wide compatibility makes it possible to upgrade boards or software without purchasing a new monitor.
- MultiSync has a maximum horizontal resolution of 800 dots and a maximum vertical resolution of 560 lines for superior clarity of display.
- MultiSync offers both TTL and ANALOG signal inputs, and in the ANALOG mode can display an unlimited palette of colors depending on the graphics board and software being used.
- MultiSync features a TEXT SWITCH with a choice of seven colors (red, blue, green, cyan, yellow, white and magenta) displaying word processing, spread sheets, databases or other software in crisp alphanumeric text on a dark-bulb black background.
- MultiSync has a 14 inch diagonal display and a large, 13 inch viewing area.



① POWER SWITCH

Used to turn the power ON or OFF. When the power is ON, the power indicator is lit.

② MANUAL SWITCH

This switch selects either the IBM mode when OFF or the manual mode when ON.

When this switch is OFF, MultiSync automatically works in the IBM mode and adjusts itself to the scanning frequency, resolution and color requirements of the IBM compatible graphics adapter being used.

When this switch is ON, the user must manually select the number of colors (8/16/64) needed by the graphics adapter being used with the COLOR SWITCH (see No. ③ below). Refer to instructions accompanying the graphics adapter being used for information on how many colors the adapter can display.

③ COLOR SWITCH

The three color configurations (8/16/64 colors) necessary when using non-IBM compatible graphics adapters can be set using No. 5 and 6 of the dip switches as shown below. Refer to instructions accompanying the graphics adapter being used for information on how many colors the adapter can display.

COLOR MODE	DIP SWITCH	
	No. 5	No. 6
8 colors	OFF	ON
16 colors	OFF	OFF
64 colors	ON	OFF
UNUSED	ON	ON

NOTE

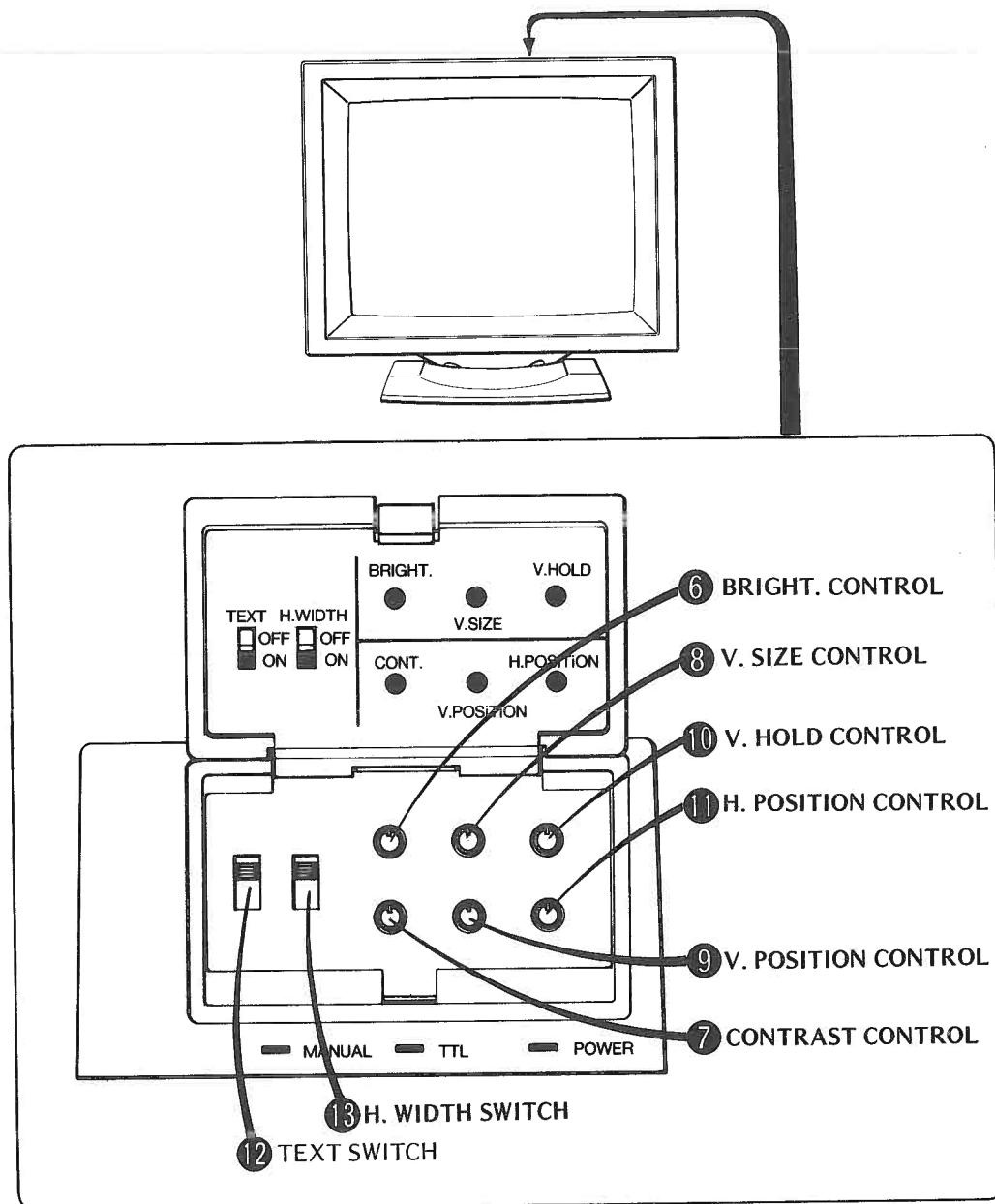
These switches should be set correctly in relation to the input signal of the graphics adapter being used. Refer to instructions accompanying the graphics adapter for information on the input signal and refer to No. ⑤ below.

④ TEXT COLOR SWITCH

Refer to No. ⑫ TEXT SWITCH for full information on using the TEXT SWITCH.

⑤ TTL/ANALOG SWITCH

Used to select an input video signal — either TTL or ANALOG — of the graphics adapter. It is important to determine whether the input signal of the graphics adapter being used is ANALOG or TTL prior to connecting the adapter with your personal computer. Refer to instructions accompanying the graphics adapter for information on the input signal.



6 BRIGHT. CONTROL

Used to adjust the picture brightness of the screen.

7 CONTRAST CONTROL

Adjusts the display to the contrast preferred by the user.

8 V. SIZE CONTROL

Turn this knob for the proper vertical size of the display. Turn the knob clockwise for a larger display; turn it counterclockwise for a smaller display.

9 V. POSITION CONTROL

Turn this knob for the proper vertical position of the display. Turn the knob clockwise for a lower display position; turn it counterclockwise for a higher display position.

10 V. HOLD CONTROL

Adjusts the vertical stability of the display.

11 H. POSITION CONTROL

Turn this knob for the proper horizontal position of the display. Turn the knob clockwise to reposition display to the right; turn it counterclockwise to reposition to the left.

12 TEXT SWITCH

This switch controls the text mode of MultiSync.

When it is ON, the text of the display will appear in one color selected by the TEXT COLOR SWITCH (No. 2, 3 and 4 of the dip switch on the rear of MultiSync), regardless of the colors of the software program being used.

When it is OFF, the color of the software program being used will again be displayed.

The diagram below of the dip switches shows how to display text in your choice of seven colors.

TEXT COLOR	DIP SWITCH		
	2 R	3 G	4 B
RED	ON	OFF	OFF
GREEN	OFF	ON	OFF
BLUE	OFF	OFF	ON
YELLOW	ON	ON	OFF
CYAN	OFF	ON	ON
MAGENTA	ON	OFF	ON
WHITE	ON	ON	ON

NOTE

The text switch works only in the TTL mode.

13 H. WIDTH SWITCH

Adjust this switch for the horizontal size of display preferred. When this switch is ON, the width of the display size changes.

NOTE

When the horizontal scanning frequency is between 15 and 20 kHz, H. WIDTH cannot be adjusted.

THE METHOD FOR MOUNTING AND REMOVING THE TILT SWIVEL BASE

1

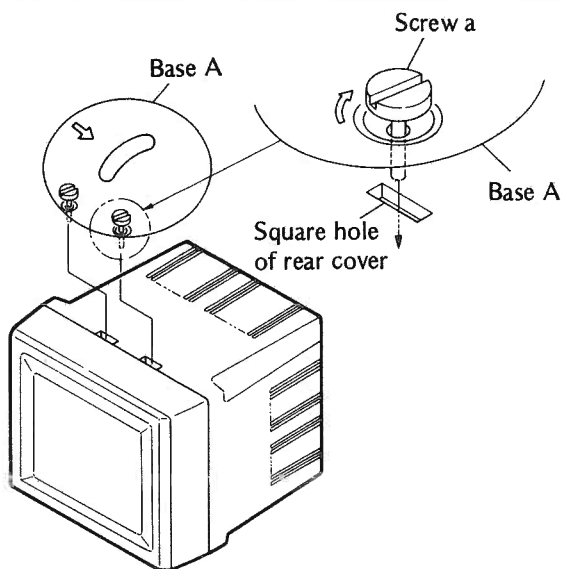


Fig. 1

- 1) Put the screw "a" into the round hole in the base "A".
- 2) Screw the base to the display set with flat type screw driver as per Fig. 1.

3

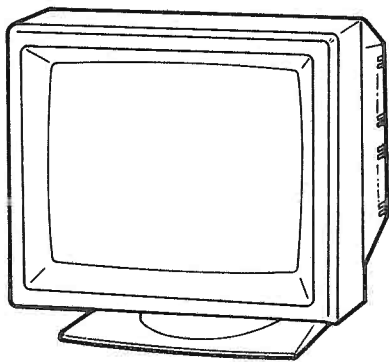


Fig. 3

Stand the display correctly so the JC-1401P3A name on the base "B" can be seen from the front.
(NOTE) When turning the display in any direction, do not apply any sudden pressure.

2

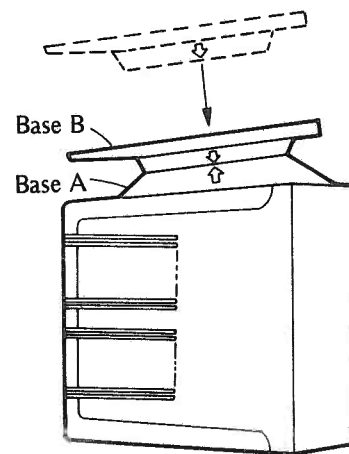
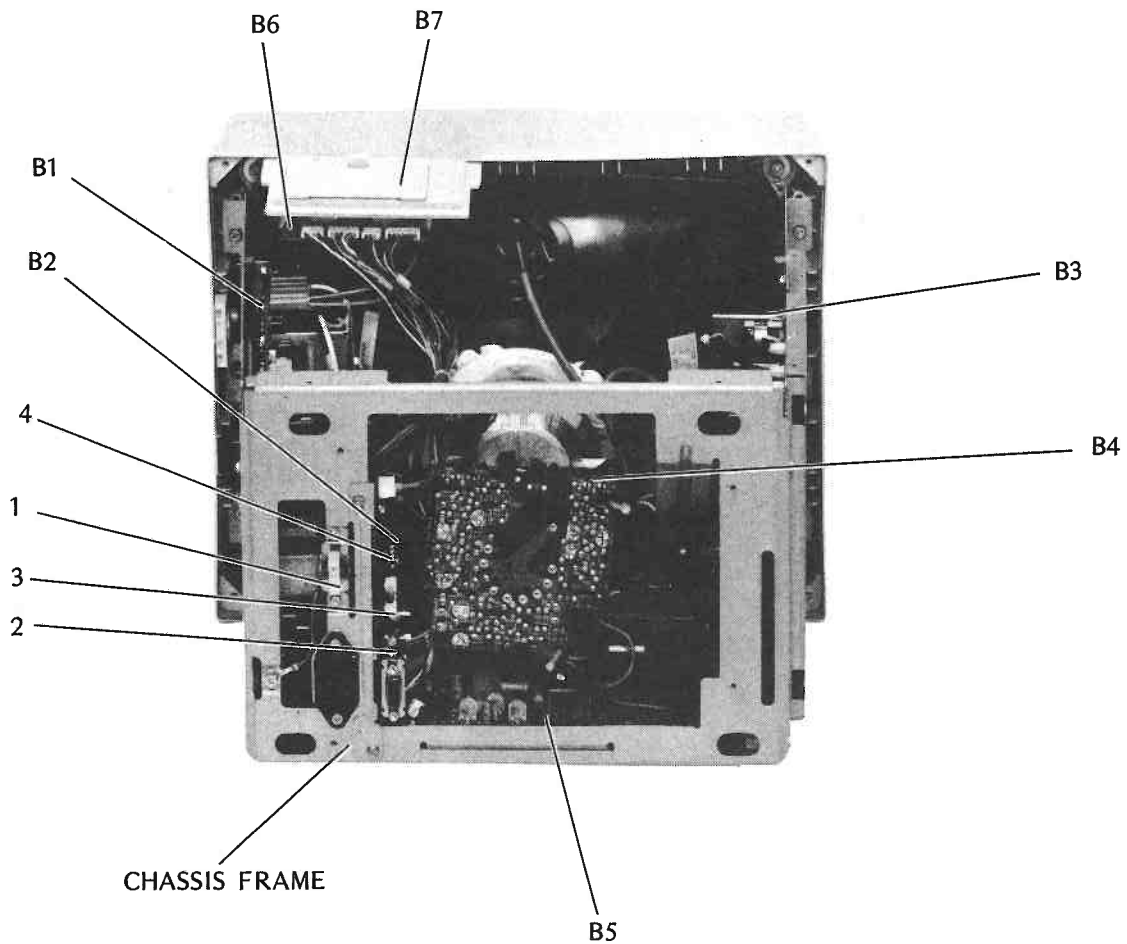


Fig. 2

1. Place the base "B" to the base "A" as per Fig. 2. ("↑" on the base "A" and "B".)
2. Turn the base "B" 180° so that the base "B" can not be unfastened.
4. To remove the swivel base, reverse the mounting procedure.

PART LOCATIONS

BOARD LAYOUT



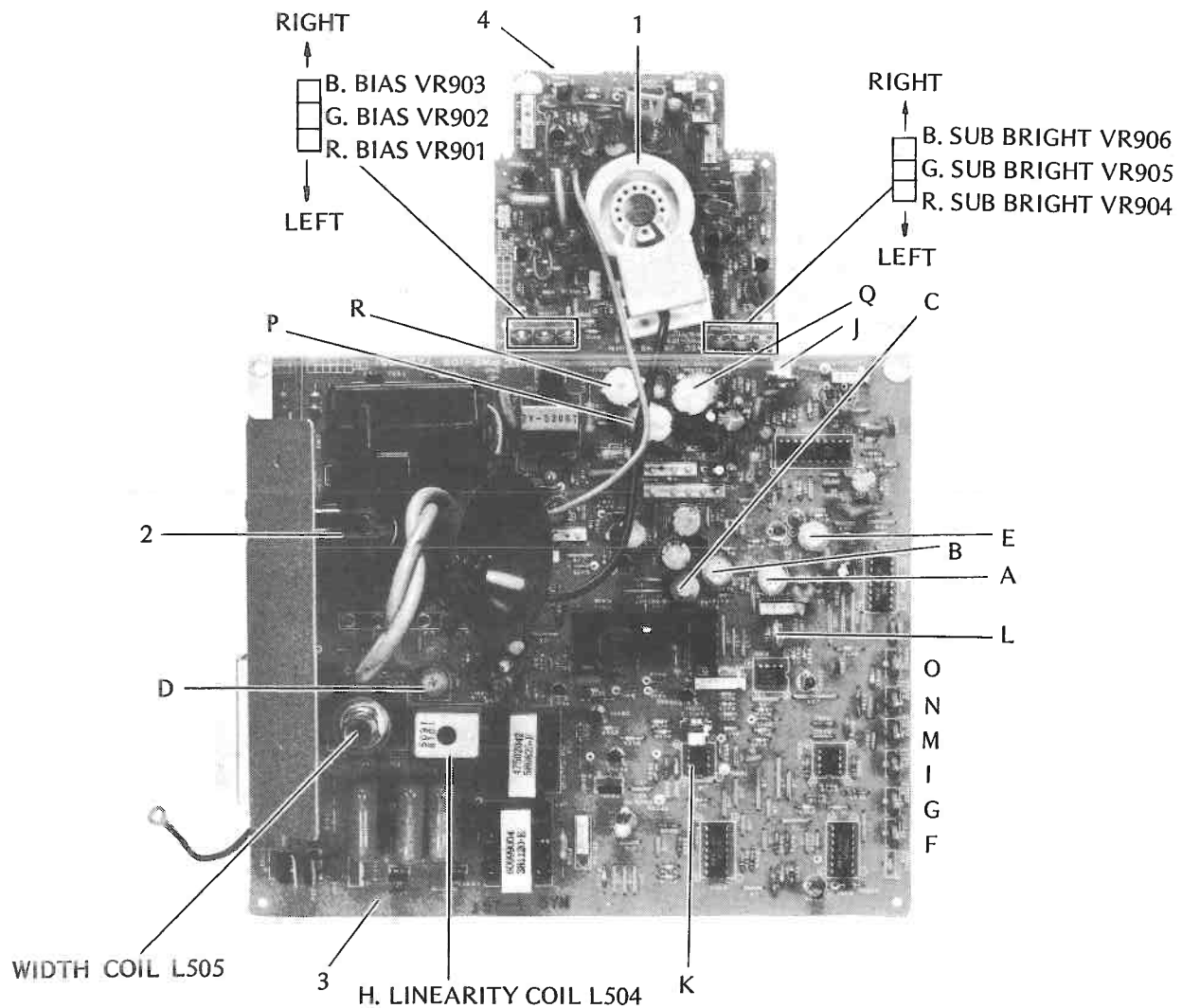
BOARDS

B1	SWITCHING REGULATOR POWER SUPPLY BOARD	PWE 107
B2	INTERFACE BOARD	PWE 110
B3	VIDEO BOARD	PWE 122
B4	CRT BOARD	PWE 123
B5	DEFLECTION BOARD	PWE 105
B6	CONTROL BOARD	PWE 125A
B7	LED BOARD	PWE 125B

USER CONTROLS

1	POWER SWITCH
2	TTL/ANALOG SWITCH
3	MANUAL SWITCH
4	TEXT COLOR SWITCH

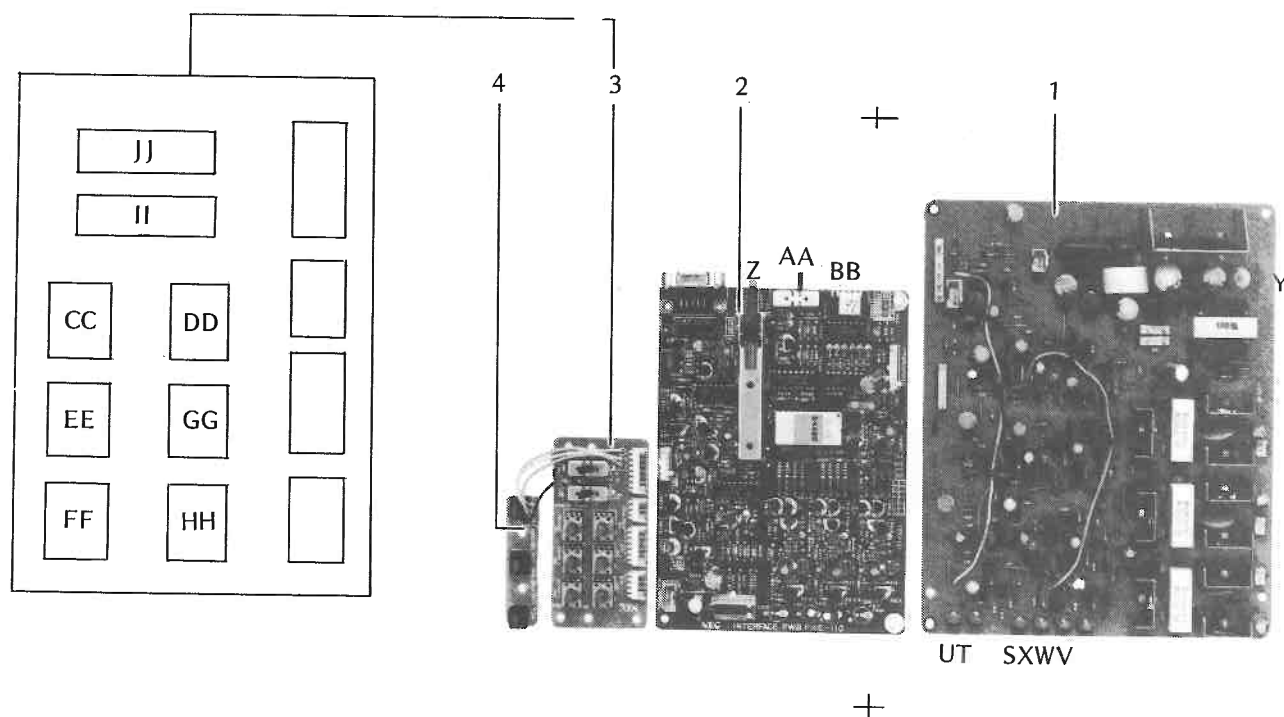
1	CRT SOCKET	
2	FLYBACK TRANSFORMER	
3	DEFLECTION BOARD	PWE 105
4	CRT BOARD	PWE 123



ADJUSTMENT CONTROLS

A	V. LINEARITY (2) (VR401)	K	+16V ADJUST (VR551)
B	V. LINEARITY (1) (VR402)	L	F.V ADJUST (VR552)
C	SUB. HEIGHT (1) (VR403)	M	SUB. H CENTER (2) (VR553)
D	SIZE PIN-CUSION (VR404)	N	SUB. H CENTER (3) (VR554)
E	V. BIAS (VR405)	O	H. HOLD (2) (VR555)
F	V. MODE (VR451)	P	H. V. ADJUST (VR2001)
G	SUB. HEIGHT (2) (VR452)	Q	H. V. PROTECTOR (1) (VR2002)
I	SUB. H. CENTER (1) (VR501)	R	H. V. PROTECTOR (2) (VR2003)
J	H. HOLD (1) (VR502)		

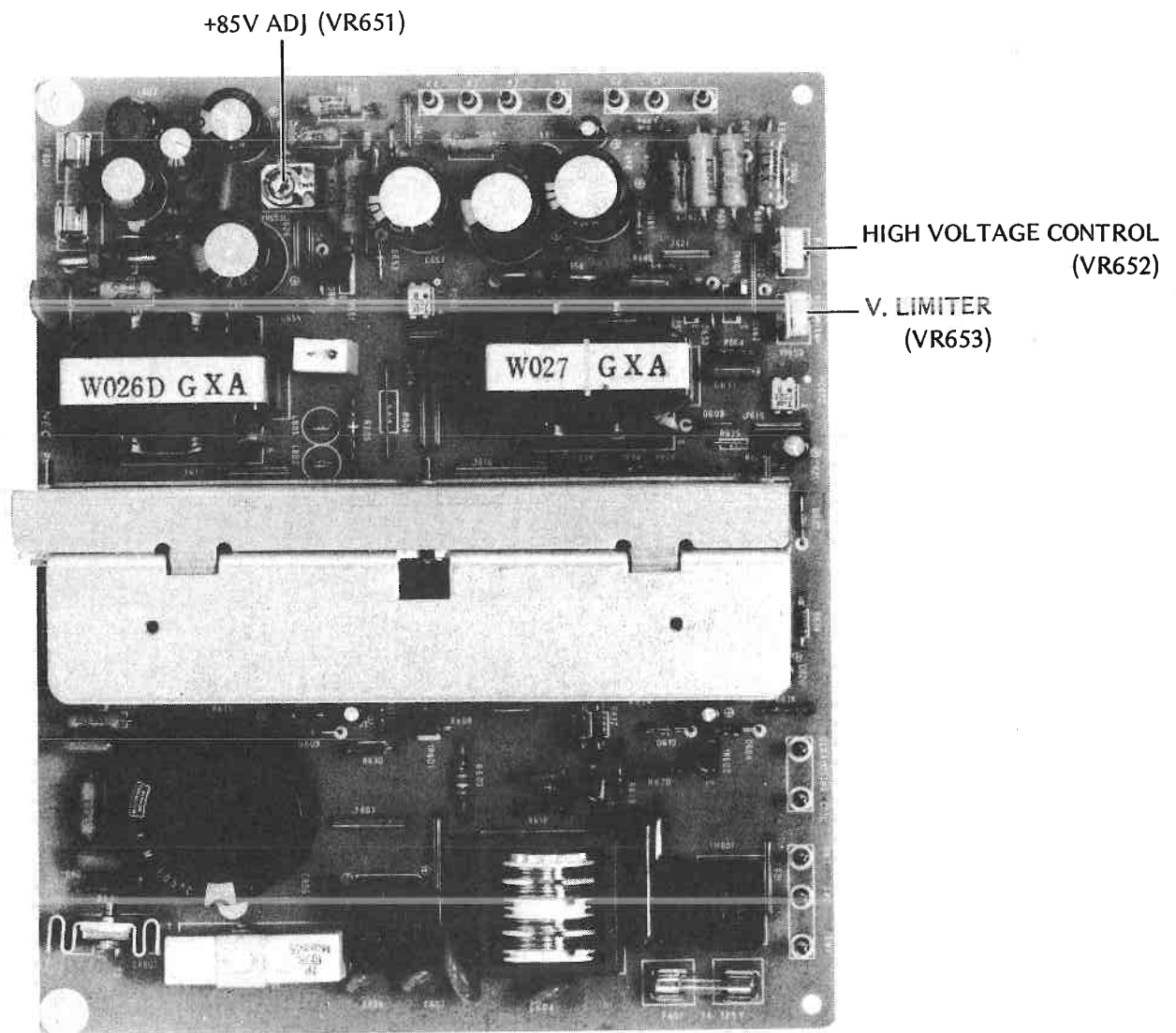
1	VIDEO BOARD	PWE 122
2	INTERFACE BOARD	PWE 110
3	CONTROL BOARD	PWE 125A
4	LED BOARD	PWE 125B



ADJUSTMENT CONTROLS

S	R. SUB CONTRAST CONTROL (VR701)	BB	COLOR SWITCH (SW803 NO. 5, 6)
T	G. SUB CONTRAST CONTROL (VR702)	CC	CONTRAST CONTROL (VR1)
U	B. SUB CONTRAST CONTROL (VR703)	DD	BRIGHTNESS CONTROL (VR2)
V	R. GAIN CONTROL (VR704)	EE	V. POSITION CONTROL (VR3)
W	G. GAIN CONTROL (VR705)	FF	H. POSITION CONTROL (VR5)
X	B. GAIN CONTROL (VR706)	GG	V. SIZE CONTROL (VR4)
Y	+6V ADJUST CONTROL (VR707)	HH	V. HOLD CONTROL (VR6)
Z	TTL/ANALOG SWITCH (SW801)	II	H. WIDTH SWITCH
AA	MANUAL SWITCH (SW802)	JJ	TEXT SWITCH
BB	TEXT COLOR/SWITCH (SW803 NO. 2, 3, 4)		

SW. REG. PWB LAYOUT



ALIGNMENT PROCEDURE

Adjustment conditions and Precautions

1. Power supply voltage: AC 120V, 60 Hz
2. Warm up time
The display must be on for at least 20 minutes before starting alignments.
This is especially critical in color temperature and white balance adjustments.
3. Signals
Video: Analog 0.6 Vp-p, 75 Ω , positive
analog sync. on green
video: 0.6 Vp-p
synchronizing: 0.3 Vp-p
Synchronizing: TTL level negative/positive
separate/composite
Scanning Frequency: H 15 kHz ~ 35 kHz
V 60 Hz
Unless otherwise specified, adjust at signal 6 (22 kHz).

1. SW. REG. UNIT

- 1-1. +B₁ (VR651) +85V LINE
Adjust VR651 to be 85 VDC
- 1-2. +B_H (VR652) High Voltage control
This control is permanently sealed at factory.
Do not attempt to readjust.
- 1-3. +B_{LIM} (VR653) V. limit (C1 — Gnd Voltage)
Remove C-connector.
Adjust VR653 to be 122 Volts.

Note: Do not operate the SW. Reg. unit itself without any load.

2. DEF PWB Pre-Adjustment

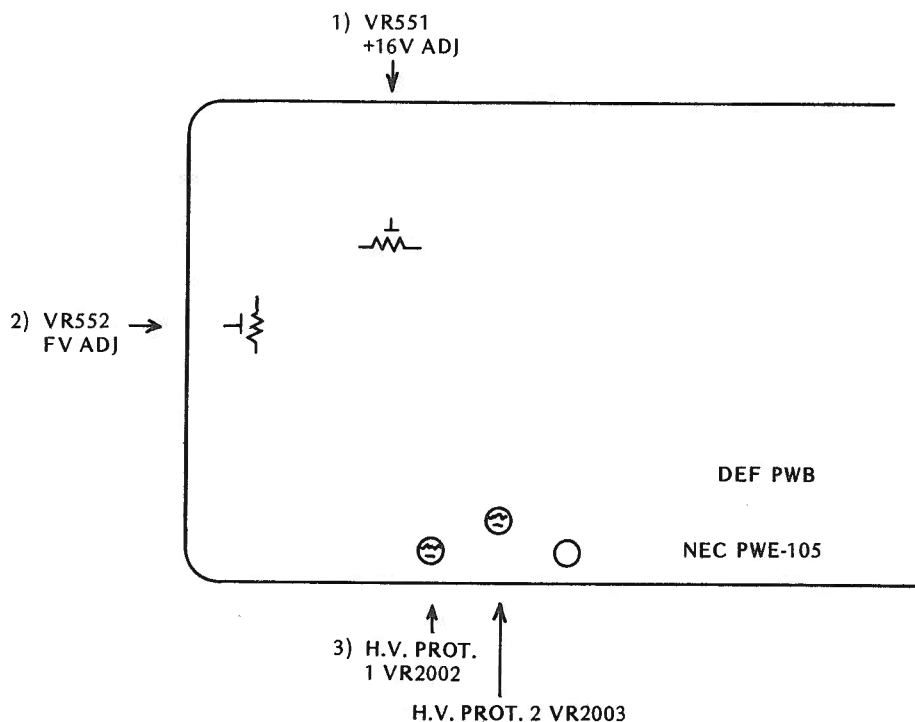


Figure 1

Remove K and C connectors, and Apply 24V DC between K2 and K3.

Or just only remove C connector.

(1) +16V adjustment

Adjust TP551-GND to $16V \pm 0.05V$ DC. (VR551)

(2) Receive signal 1 and adjust VR552 so that the voltage between TP552 and Gnd is $10 \pm 0.05V$ DC.

(3) H.V. Protector

The high Voltage protector control 1 (VR2002) and control 2 (VR2003) are permanently sealed at factory.

Do not attempt to readjust!

3. Video PWB pre-Adjustment

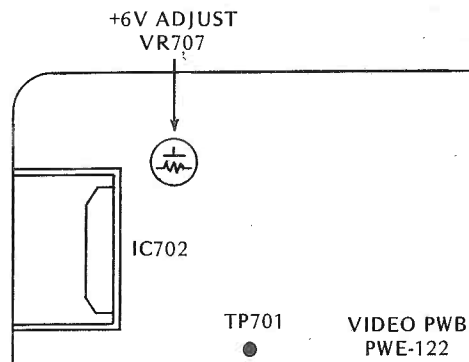


Figure 2

(1) +6V adjustment

Adjust VR707 so that the voltage between TP701 and GND is $6V \pm 0.05V$ DC.

4. Main Adjustments

Unless otherwise specified, adjust the controls on the control PWB as shown below:

- VR1 Contrast : Max. (fully clockwise)
- VR2 Brightness: So that no background raster appears
- VR3 V. position: Center
- VR4 H. position: Center
- VR5 V. size: Center
- VR6 V. hold: Proper position

SW2 H. size: ON

SW3 TEXT SW: OFF

Focus control: Adjust for the optimum picture.

4-1) Adjustment of H. raster centering

Turn the brightness control fully clockwise so that background raster can be seen, then connect the H connector in the position so that the background raster is in the center of the CRT screen.

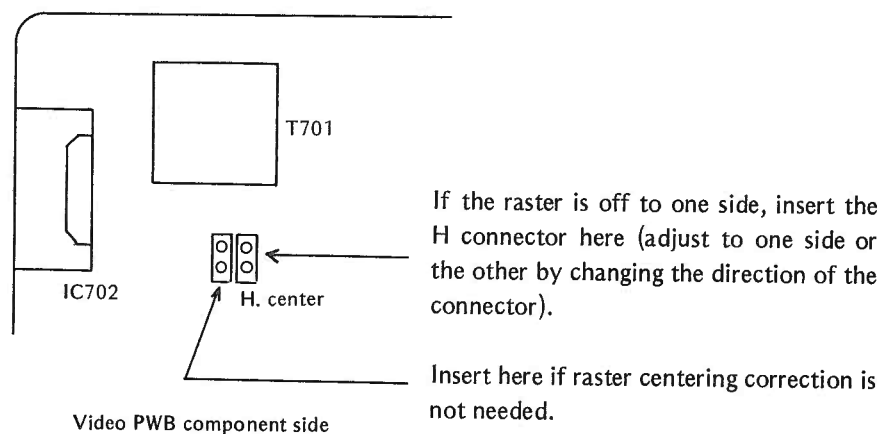


Figure 3

NOTE: Due to overscan, it is not possible to center the background raster if the horizontal frequency is between 15 kHz and 20 kHz.

4-2)

(1) H. hold

- Short between TP501 and GND.
- Apply signal 3 (30 kHz) and adjust H. hold (1) VR502 so that the entire picture appears.
- Apply signal 2 (20 kHz) and adjust H. hold (2) VR555 so that the entire picture appears.

(2) H.V. ADJ (VR2001)

The H.V. ADJ (VR2001) is permanently sealed at factory.
Do not attempt to readjust.

(3) H. linearity

Adjust L504 for the optimum H. linearity. If at this time the picture is horizontally mispositioned, it is possible to adjust VR4 to center it, but after adjustment of the linearity set VR4 to the mechanical center.

(4) H. position (adjust to the center of the raster)

- Adjust sub H. center 1 VR501 to center the picture when signal 3 (30.48 kHz) is applied.
- Adjust sub H. center 3 VR554 to center the picture (1 mm to the left) when signal 6 (22 kHz) is input for mutuality between actual EGA timing and test timing.
- Adjust sub H. center 2 VR553 to center the picture when signal 5 (15.75 kHz) is applied.
- Check that the picture is centered when the signals in a), b), and c) above are applied.

NOTE: Adjust in the order a) → b) → c)

(5) Side pincushion

Adjust VR404 for the optimum side pincushion distortion.
Be careful that there is no barrel distortion.

- (6) H. width
Adjust H. width L505 so that the size of the picture when signal 6 (22 kHz) is applied is 250mm. Perform this adjustment with the H. wide switch SW2 on. If the size cannot be adjusted to 250mm even if H. width L505 is turned fully, turn L504 slightly to correct this.
- (7) V. position
Vertically center the picture when adjustment signal 6 (22 kHz) is applied (VR3, V. POSITION)
- (8) V. linearity
Adjust VR401 and VR402 so that vertical linearity is optimum when signal 6 (22 kHz) is applied.
- (9) V. size/V. bias
 - a) Adjust sub height VR403 so that the vertical amplitude is 180 mm when signal 3 (30.48 kHz) is applied is 180 mm.
Also adjust V. bias VR405 so that the voltage between DY4 and GND is 11.5V DC.
 - b) Adjust sub height VR452 so that the vertical amplitude when signal 5 (15.75 kHz) is applied is 180 mm.
 - c) Adjust V-mode VR451 so that the vertical amplitude is 180 mm when V-mode signal 4 (30.48 kHz, 400 lines) is applied.
Set the MANUAL switch to the OFF (PRE-SET mode) when performing this adjustment.
Also V-mode (Input pin #5) should be low.
 - d) Applies the signals in above steps a), b), and c) and check that the vertical amplitude for each is $180 \text{ mm} \pm 2 \text{ mm}$. If readjustment is necessary, start from step a) and proceed in order.

4-3) Adjustment of video amplitude and white balance

NOTE: Before performing this adjustment, check that the video signals are as follows:
 Be sure to set the TTL/ANALOG SW to ANALOG position.
 Video: analog 0.6 Vp-p
 Synchronizing: separate TTL level
 Unless otherwise specified, use signal 8 for the adjustments.

- (1) Initial setting of adjustment VR

VR701 ~ 703 SUB cont. control	Fully clockwise
VR704 ~ 706 GAIN control	Fully counterclockwise
VR901 ~ 903 BIAS control	Fully counterclockwise
VR904 ~ 906 SUB BRIGHT control	Fully clockwise
- (2) Video contrast adjustment
 - a) Adjustment of gain control — use signal 7
 - i) Receive a window pattern (within a range for which ABL does not function even with a maximum contrast, and preferably with a video range of $1/3$ to $1/2 H \times 1/2 V$).
 - ii) Turn the contrast control fully clockwise and the brightness control fully counterclockwise.
 - iii) Adjust VR704, VR705, and VR706 so that R, G, and B OUT respectively on the video PWB become 40 Vp-p. After adjusting, check each Vp-p, and if not proper readjust.

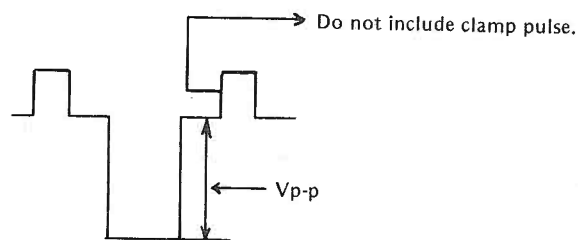


Figure 4

- b) Adjustment of sub-contrast control — use signal 7
 - i) Turn both the contrast and brightness controls fully counterclockwise.
 - ii) Adjust VR701, VR702, and VR703 so that R, G, and B OUT respectively on the video PWB become 10 Vp-p. After adjusting, check each Vp-p, and if not proper readjust.

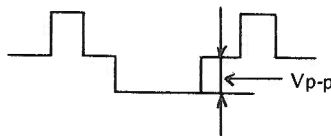


Figure 5

- (3) Cut-off adjustment (all black signals)

Turn the contrast control (VR1) and screen control of FBT fully counterclockwise.

 - a) Short TP401 — GND. (DEF PWB)
Short TP901 — TP902. (CRT PWB)
 - b) Turn the screen control clockwise gradually and set to the position at which a single horizontal color appears faintly.
Take this color as the reference color for cut-off adjustment.
 - c) Turn the bias controls for a color other than the reference color clockwise until it is as bright as the reference color.
 - d) Remove the TP401-GND and TP901-TP902 shorts.

NOTE: Perform the cut-off adjustment in as dark a place as possible, as this will facilitate white tracking.
- (4) Adjustment of sub-brightness VR
 - a) Receive the signal 8 (15.75 kHz) H grey scale (16 grades).
IF signal generator does not function white H grey scale (16 grades), Apply 0.2 V Video input instead of 5/16 grades.
 - b) Turn the contrast control fully clockwise and the brightness control fully counterclockwise.
 - c) Adjust sub-bright VR905 so that the 5/16 grade appears faintly.
From this point on, leave VR905 in this position.
 - d) Turn the contrast control fully counterclockwise and the brightness control fully clockwise.
 - e) Receive all black signals.
 - f) Adjust VR904 and VR906 so that the background raster becomes white.
- (5) Fine adjustment of white balance
 - a) Receive the white H grey scale (16 grades).
IF signal generator does not function white H grey scale (16 grades), Apply white window pattern.
(Window pattern within a range for which ABL does not function)

- b) Turn the contrast control fully clockwise.

Adjust the brightness control so that no background raster appears and check that the white balance is proper for each grade.

If the white balance is off for the upper grades, fine adjust the gain control, VR704, and VR706 to match the white.

ATTENTION: Do not touch VR705 – G Gain.

- c) Turn the contrast control fully counterclockwise and the brightness control fully clockwise.

Check that the white balance is proper for each grade.

If the white balance is off, fine adjust sub cont. VR701 and VR703 to match the white.

ATTENTION: Do not touch VR702 – G sub cont.

If the background raster and the white for the different grades are off, fine adjust sub bright VR904 and VR906.

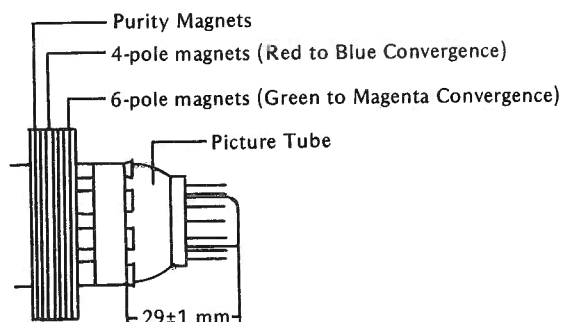
ATTENTION: Do not touch VR905 – G sub bright.

6. Focus Adjustment (Use signal 3)

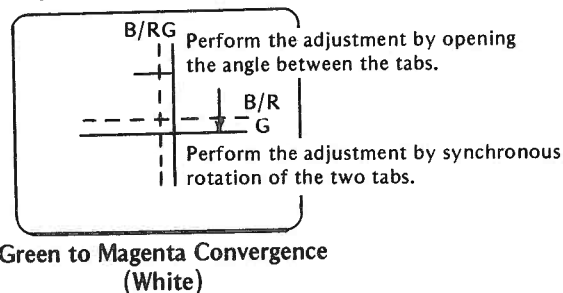
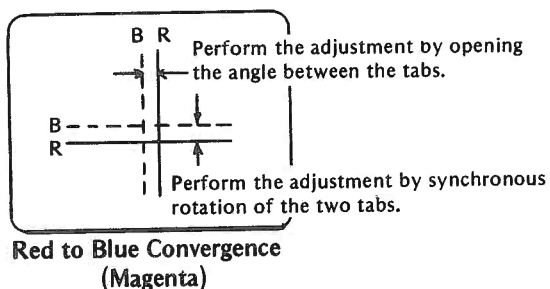
Turn the contrast control fully clockwise and set the brightness control to a suitable position. Adjust the focus control to the optimum position.

7. Purity Adjustment

- 1) Be sure that the display is not being exposed to any external magnetic fields.
- 2) Ensure that the spacing between the Purity, Convergence Magnet, (PCM), assembly and the CRT stem is $29 \text{ mm} \pm 1 \text{ mm}$. (See below diagram)
- 3) Produce a complete, red pattern on the display. Adjust the Purity magnet rings on the PCM assembly to obtain a complete field of the color red. This is done by moving the two tabs in such a manner that they advance in an opposite direction but at the same time to obtain the same angle between the two tabs, which should be approximately 180° .
- 4) Check the complete blue and complete green patterns to observe their respective color purity. Make minor adjustments if needed.



Purity, Convergence Magnet Assembly (PCM)



8. Convergence Adjustment

- 1) Produce a magenta crosshatch on the display.
- 2) Adjust the focus for the best overall focus on the display.
Also adjust the brightness to the desired condition.
- 3) Vertical red and blue lines are converged by varying the angle between the two tabs of the 4-pole magnets on the PCM assembly. (See above diagrams)
- 4) Horizontal red and blue lines are converged by varying the two tabs together, keeping the angle between them constant.
- 5) Produce a white crosshatch pattern on the display.
- 6) Vertical green and magenta lines are converged by varying the angle between the two tabs of the 6-pole magnets.
- 7) Horizontal green and magenta lines are converged by varying the two tabs together, keeping the angle between them constant.

9. Switches and Controls Operation

Confirm the following SWs and controls operate correctly.

Switches

Switches

- 1) TTL/ANALOG SW
- 2) MANUAL SW
- 3) 8/16/64 color select SW
- 4) TEXT SW
- 5) TEXT color SW
- 6) H. Width SW



LOW C



No effect

Controls

- 1) Brightness
- 2) Contrast
- 3) V. size
- 4) V. position
- 5) V. Hold
- 6) H. position

10. Multi Scanning Operation

Confirm the Multi Sync operate correctly with IBM PC W/C GA, EGA also PGA, or with signal 3, 4, 5, and 6.

BY LVG-1600																		
				ROM DATA								ROM DATA						
						ROM Address		Signal 1		25K		Signal 2		20K				
①	②	③	④	⑤	(X00)	2	0.	8	0	0	F	1	6.	6	4	0	F	
0	CLOCK	DOT CLOCK FREQUENCY	0	MHz	(X03)	2	5.	0	0	0	F	2	0.	0	0	0	F	
1	H FREQ	HORIZONTAL FREQUENCY	1	KHz	(X06)	5	9.	9	5	2	F	6	0.	0	6	0	F	
2	V FREQ	VERTICAL FREQUENCY	2	Hz	(X09)			H ₀	8	V ₁	0			H ₀	8	V ₁	0	
3	CH	CHARACTOR CELL SIZE	3	DOT	(X0B)				F	1	0	4			F	1	0	4
4	Nht	4	4	CHR	(X0D)				F	0	8	0			F	0	8	0
5	Nht	5	5	CHR	(X0F)				E	0	8	8			F	0	8	8
6	Nhsp	6	6	CHR	(X11)			V ₀	3	H ₀	8			V ₀	3	H ₀	8	
7	Vpw-Hpw	7	7	V (LASTER) H (CHR)	(X13)					0	7					0	3	
8	Nadj	8	8	H (LASTER)	(X14)				F	0	4	1			F	0	3	3
9	Nvt	9	9	LINE	(X16)				F	0	3	8			F	0	3	0
10	Nvd	10	10	LINE	(X18)				F	0	3	8			F	0	3	0
11	Nvsp	11	11	LINE	(X1A)					0	1					0	1	
12	Nvsadj	12	12	H (LASTER)	(X1B)						0	0					0	0
13	INT	13	13		(X1C)	F	0	0	0	0	1	F	0	0	0	0	1	
14	OUT	14	14	without dots														

BY LVG-1600																			
①	②	③	④	⑤	ROM Adress	ROM DATA signal 3 480 LINE					ROM DATA signal 4 400 LINE								
						(X00)	2	5.	1	1	0	F	2	5.	1	1	0	F	
0	CLOCK	DOT CLOCK FREQUENCY	0	MHz	(X03)	3	0.	4	7	3	F	3	0.	4	7	3	F		
1	H FREQ	HORIZONTAL FREQUENCY	1	KHz	(X06)	5	9.	9	8	7	F	5	9.	9	8	7	F		
2	V FREQ	VERTICAL FREQUENCY	2	Hz	(X09)			H ₀	8	V ₁	0			H ₀	8	V ₁	0		
3	CH	CHARACTOR CELL SIZE	3	DOT	(X0B)			F	1	0	3			F	1	0	3		
4	Nht	4	4	CHR	(X0D)			F	0	8	0			F	0	8	0		
5	Nht	5	5	CHR	(X0F)			F	0	8	0			F	0	8	0		
6	Nhsp	6	6	CHR	(X11)			V ₀	2	H ₁	4			V ₀	2	H ₁	4		
7	Vpw-Hpw	7	7	V (LASTER) H (CHR)	(X13)					0	8					0	8		
8	Nadj	8	8	H (LASTER)	(X14)			F	0	5	0			F	0	5	0		
9	Nvt	9	9	LINE	(X16)			F	0	4	8			F	0	4	8		
10	Nvd	10	10	LINE	(X18)			F	0	4	8			F	0	4	8		
11	Nvsp	11	11	LINE	(X1A)					0	1					0	1		
12	Nvsadj	12	12	H (LASTER)	(X1B)					0	0					0	0		
13	INT	13	13																
14	OUT	14	0	Sync NEG	Sync OFF	TTL OUT	RZ.....	without dots											
			1	POS	HVsync ON	ANALOG OUT	NRZ.....	dots											
					(X1C)	F	1	1	0	1	1	F	1	1	0	1	1		

BY LVG-1600																	
		②		③	④	⑤	ROM Address	ROM DATA Signal 5					ROM DATA Signal 6				
								1	4.	2	0	0	F	1	6.	3	7
①	0	CLOCK	DOT CLOCK FREQUENCY		0	MHz	(X00)										
1	H FREQ		HORIZONTAL FREQUENCY		1	KHz	(X03)	1	5.	8	5	0	F	2	2.	0	3
2	V FREQ		VERTICAL FREQUENCY		2	Hz	(X06)	6	0.	5	7	7	F	5	9.	5	3
3	CH		CHARACTOR CELL SIZE		3	DOT	(X09)			H ₀	8	V ₁	0			H ₀	8
4	Nht				4	CHR	(X0B)				F	1	1	2		F	0
5	Nht				5	CHR	(X0D)				F	0	8	0		F	0
6	Nhsp				6	CHR	(X0F)				F	0	9	2		F	0
7	Vpw-Hpw				7	V (LASTER) H (CHR)	(X11)			V ₀	1	H ₀	7			V ₁	3
8	Nadj				8	H (LASTER)	(X13)						0	0			
9	Nvt				9	LINE	(X14)				F	0	2	6		F	0
10	Nvd				10	LINE	(X16)				F	0	2	0		F	0
11	Nvsp				11	LINE	(X18)				F	0	2	3		F	0
12	Nvsadj				12	H (LASTER)	(X1A)						0	5			
13	INT				13		(X1B)							0	0		
14	OUT				14		(X1C)	F	1	0	0	0	1		F	1	

BY LVG-1600																								
①	②	③	④	⑤	ROM Address	ROM DATA signal 7								ROM DATA										
						1/4H WINDOW				15.75K				Signal 8										
						1	4.	2	0	0	F	1	4.	2	0	0	F	1	4.	2	0	0	F	
0	CLOCK	DOT CLOCK FREQUENCY	0	MHz	(X00)	1	4.	2	0	0	F	1	4.	2	0	0	F	1	4.	2	0	0	F	
1	H FREQ	HORIZONTAL FREQUENCY	1	KHz	(X03)	1	5.	8	5	0	F	1	5.	8	5	0	F	1	5.	8	5	0	F	
2	V FREQ	VERTICAL FREQUENCY	2	Hz	(X06)	6	0.	5	7	7	F	6	0.	5	7	7	F	6	0.	5	7	7	F	
3	CH	CHARACTOR CELL SIZE	3	DOT	(X09)			H ₀	8	V ₁	0			H ₀	8	V ₁	0			H ₀	8	V ₁	0	
4	Nht	4	4	CHR	(X0B)			F	1	1	2			F	1	1	2			F	1	1	2	
5	Nht	5	5	CHR	(X0D)			F	0	2	0			F	0	2	0			F	0	2	0	
6	Nhsp	6	6	CHR	(X0F)			F	0	6	2			F	0	6	2			F	0	6	2	
7	Vpw-Hpw	7	7	V(LASTER) H(CHR)	(X11)			V ₀	1	H ₀	7			V ₀	1	H ₀	7			V ₀	1	H ₀	7	
8	Nadj	8	8	H (LASTER)	(X13)						0	0					0	0					0	0
9	Nvt	9	9	LINE	(X14)			F	0	2	6			F	0	2	6			F	0	2	6	
10	Nvd	10	10	LINE	(X16)			F	0	1	0			F	0	1	0			F	0	2	0	
11	Nvsp	11	11	LINE	(X18)			F	0	1	8			F	0	1	8			F	0	2	3	
12	Nvsadj	12	12	H (LASTER)	(X1A)					0	5					0	5					0	5	
13	INT	13	13		(X1B)						0	0					0	0					0	0
14	OUT	14	14	without dots	(X1C)	F	1	0	0	1	1	F	1	0	0	1	1	F	1	0	0	1	1	
				dots																				

① Indication address

② Abbreviation

③ Description

④ Contents

⑤ Unit

Description of each address

add.	Description	Condition
0		05.000 ~ 40.000 MHz, 5- or 6-digit 2.5KHz step for 10 MHz or lower, 5 KHz step for 10 ~ 20 MHz, and 10 KHz step for 20 MHz or higher
1		Reference data, 5-digit
2		Reference data, 5-digit
3		(H direction) x (V direction), 02 to 16 01 to 32 each 2-digit
4	Total number of characters, horizontal	255 characters or less, 3-digit
5	Number of indication characters, horizontal	N_{ht} or less, 3-digit
6	Horizontal synchronization position	N_{ht} or less, 3-digit
7	Vertical/horizontal pulse width	V: 1 to 16 H/H:1 to 15 chr.
8	Total raster adjustment	31 H or less
9	Total number of characters, vertical	127 rows or less, 3-digit
10	Number of indication characters, vertical	N_{vt} or less
11	Vertical synchronization position	N_{vt} or less
12	Vertical indication position correction	0 ~ 16 H (Synchronization position moves in the form of $N_{vsp} + N_{vsadj}$)
13	Interlace select	00: non-interlace 01: interlace
14	Output condition setting	

Likewise, when significant data is a single digit, do not forget to enter 0.

DATA FORMAT FOR USING Quantum 801C

TIMING PARAMETERS:

Real Time Parameters

Dot Rate	MHz
Horizontal Rate	KHz
Vertical Rate	Hz

Non-Real Time Parameters

Horizontal	Vertical
Dots/Character	Lines/Character
Total	Total
Characters	Rows
Drive Delay	Drive Delay
Drive Width	Drive Width
	Step Width

SIGNAL'S DISCRIPTION:

Signal No.	Description
1	H: 25kHz
2	H: 20kHz
3	H: 30.48kHz (480 lines)
4	H: 30.48kHz (400 lines)
5	H: 15.85kHz
6	H: 22kHz
7	H: 15.85kHz WINDOW PATTERN
8	H: 15.85kHz

OPTION PARAMETERS

Signal Gating

Composite Sync	OP 1.—0 = off 1 = on
Vertical Step	OP 2.—0 = off 1 = on
Horizontal Drive	OP 3.—0 = off 1 = on
Vertical Drive	OP 4.—0 = off 1 = on

Signal Polarity

Composite Sync	OP 5.—0 = non-inverted 1 = inverted
Vertical Step	OP 6.—0 = non-inverted 1 = inverted
Horizontal Drive	OP 7.—0 = non-inverted 1 = inverted
Vertical Drive	OP 8.—0 = non-inverted 1 = inverted
Video	OP 13.—0 = non-inverted/positive 1 = inverted/positive 2 = non-inverted/negative 3 = inverted/negative

Interlace Mode

OP 9.—0 = non-interlace 1 = interlaced sync only 3 = interlaced sync & video
--

Video Mode

OP 10.—0 = monochrome 1 = color

Duty Cycle

OP 11.—0 = 50% 1 = 100% (OP 12.0) 0 or 1 = 100% (OP 12.2)
--

Character Clocking Mode

OP 12.—0 = single-phase 2 = dual-phase

Horizontal Skew

OP 14.—skew right 0—3 dots

Vertical Skew

OP 15.—skew down 0—9 lines

Cursor

OP 16.—0 = off 1 = fast blink 2 = slow blink 3 = on continuous

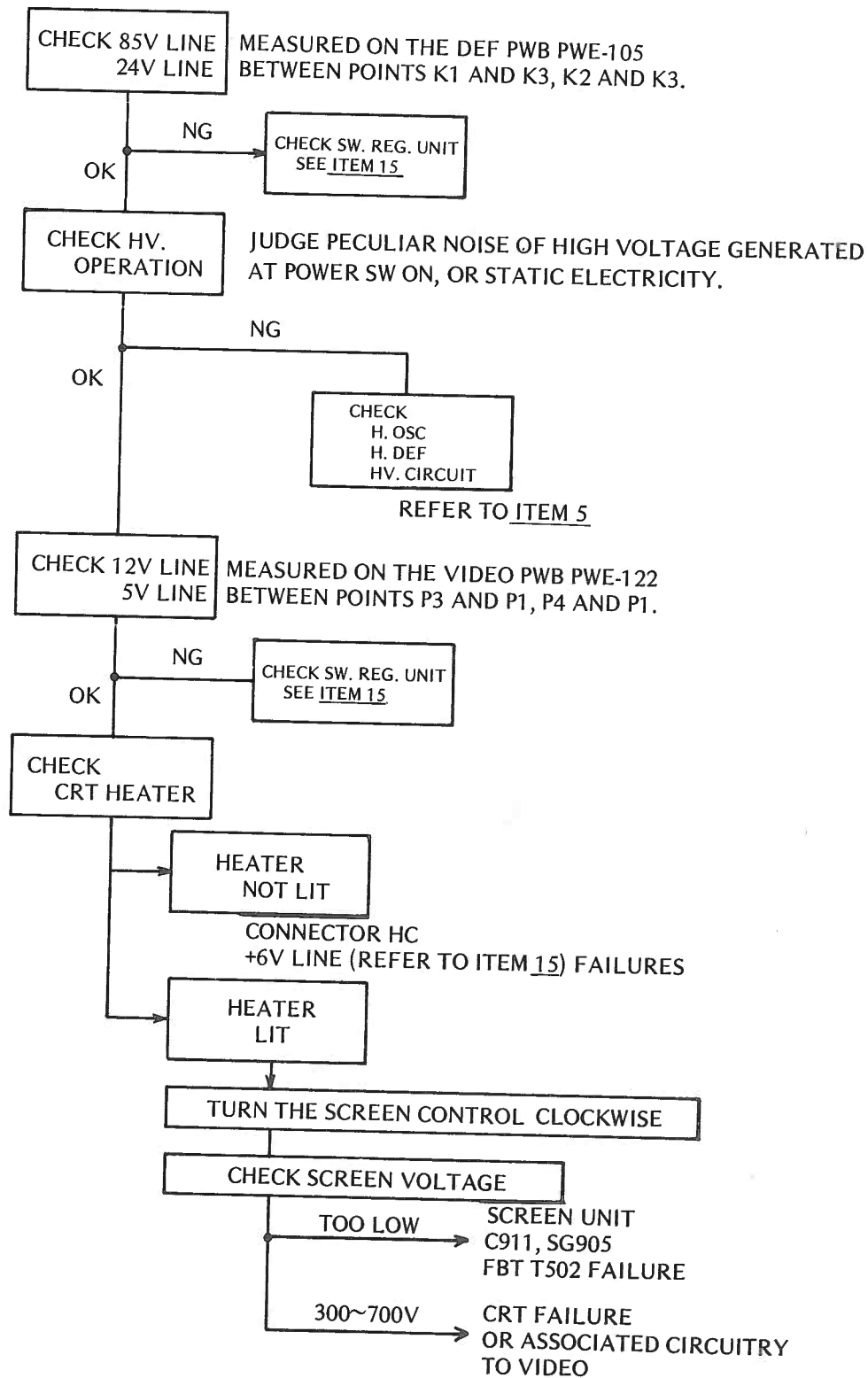
TEST SIGNALS FOR USING Quantum 801C

SIGNAL No.	1	2	3	4	5	6	7	8
Real Time Parameters								
Dot Rate (MHz)	20.800	16.640	25.112	25.112	14.200	16.368	14.200	14.200
Horizontal Rate (kHz)	25.000	20.000	30.476	30.476	15.848	22.000	15.848	15.848
Vertical Rate (Hz)	59.95	60.06	59.99	59.99	60.03	60.11	60.03	60.03
Non-Real Time Parameters								
H: Dots/Character	8	8	8	8	8	8	8	8
Total	104	104	103	103	112	93	112	112
Characters	80	80	80	80	80	80	20	80
Drive Delay	88	88	80	80	92	80	62	92
Drive Width	8	8	14	14	7	10	7	7
V: Lines/Character	10	10	10	10	10	10	10	10
Total	417	333	508	508	264	366	264	264
Rows	38	30	48	40	20	35	10	20
Drive Delay	38	30	48	44	23	35	18	23
Drive Width	3	3	2	2	1	13	1	1
Step Width	—	—	—	—	—	—	—	—
Signal Gating								
Composite Sync	1	1	1	1	1	1	1	1
Vertical Step	0	0	0	0	0	0	0	0
Horizontal Drive	1	1	1	1	1	1	1	1
Vertical Drive	1	1	1	1	1	1	1	1
Signal Polarity								
Composite Sync	1	1	1	1	1	1	1	1
Vertical Step	—	—	—	—	—	—	—	—
Horizontal Drive	1	1	1	1	1	1	1	1
Vertical Drive	1	1	1	1	1	1	1	1
Video	0	0	0	0	0	0	0	0
Interlace Mode	0	0	0	0	0	0	0	0
Video Mode	1	1	1	1	1	1	1	1
Duty Cycle	0	0	0	0	0	0	0	0
Character Clocking Mode	0	0	0	0	0	0	0	0
Horizontal Skew	—	—	—	—	—	—	—	—
Vertical Skew	—	—	—	—	—	—	—	—
Cursor	—	—	—	—	—	—	—	—

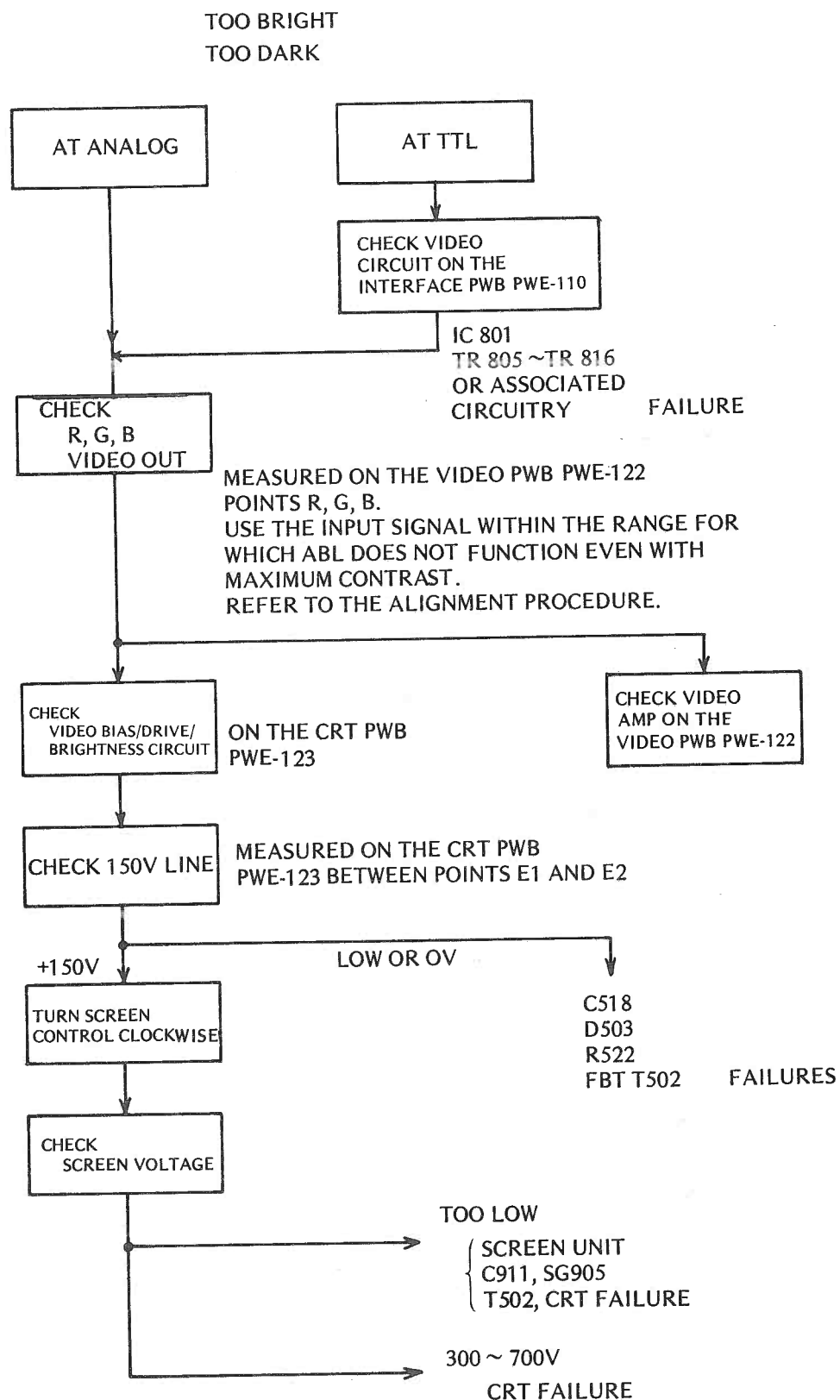
TROUBLE SHOOTING

BEFORE USING THIS CHART, PLEASE REFER TO THE TROUBLESHOOTING THE USER'S MANUAL.

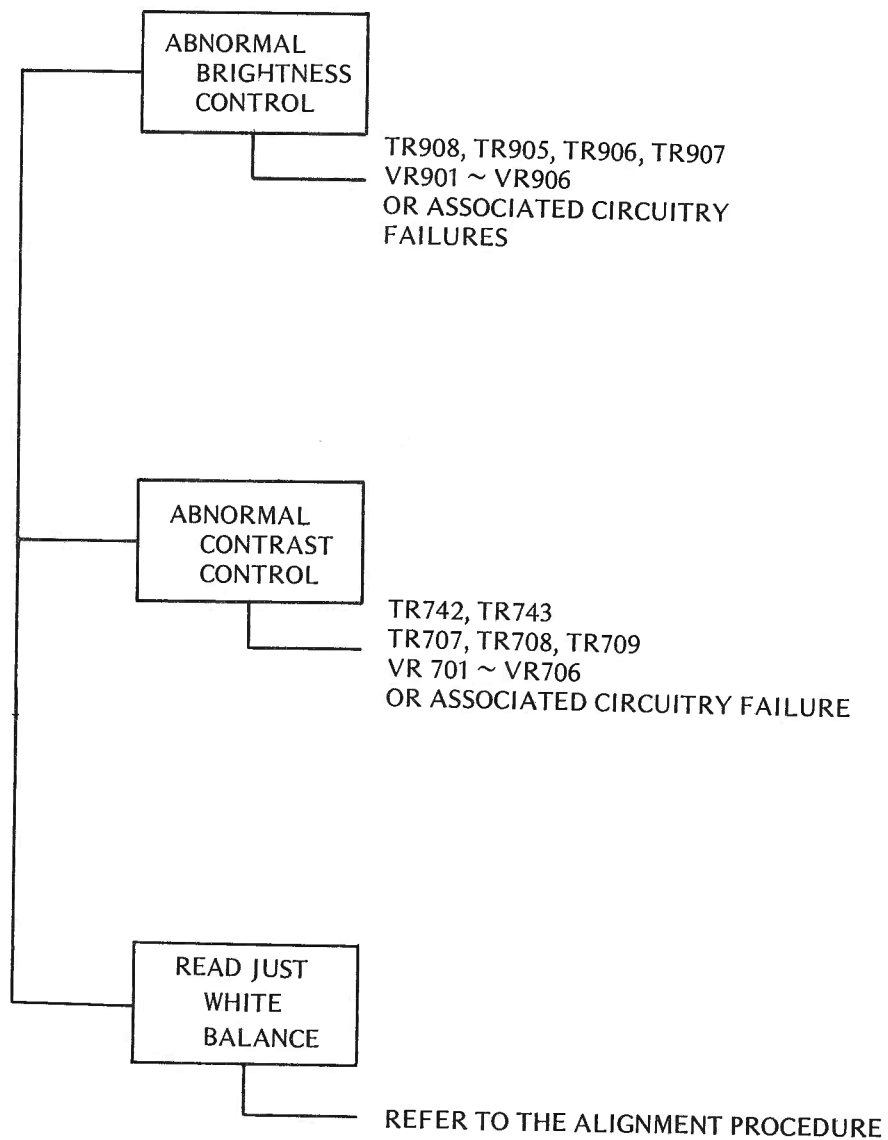
1. NO RASTER



2. ABNORMAL VIDEO ON CRT SCREEN

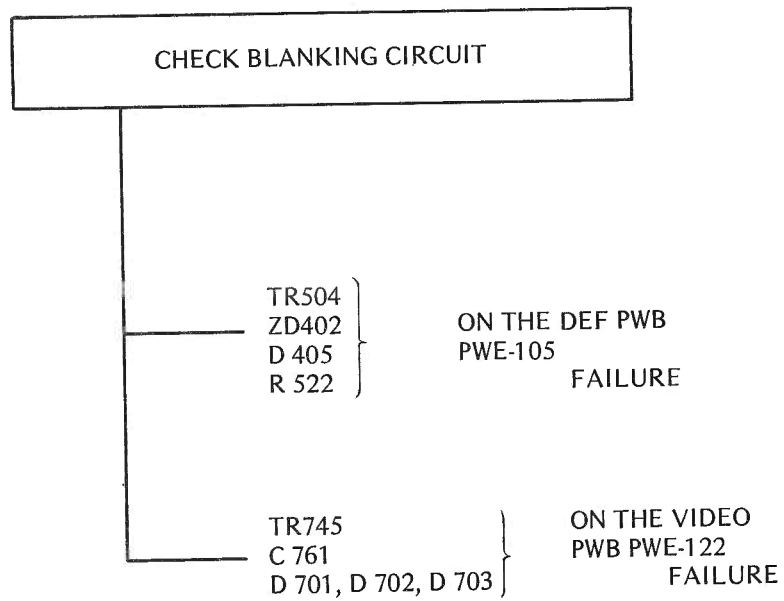


3. ABNORMAL WHITE BALANCE AND TRACKING



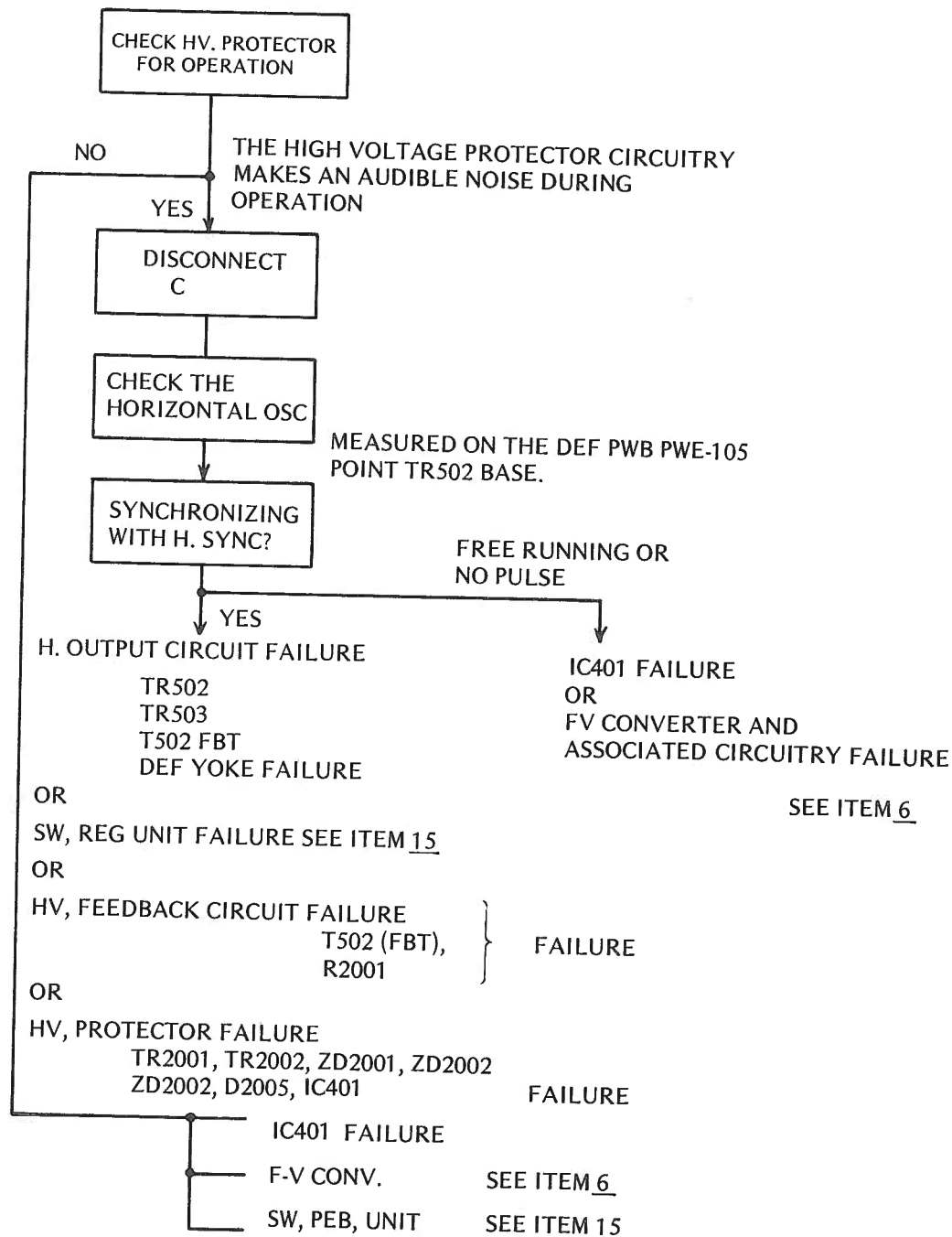
4. NO BLANKING WORKS

VISIBLE RETRACE LINE ON THE BACK RASTER

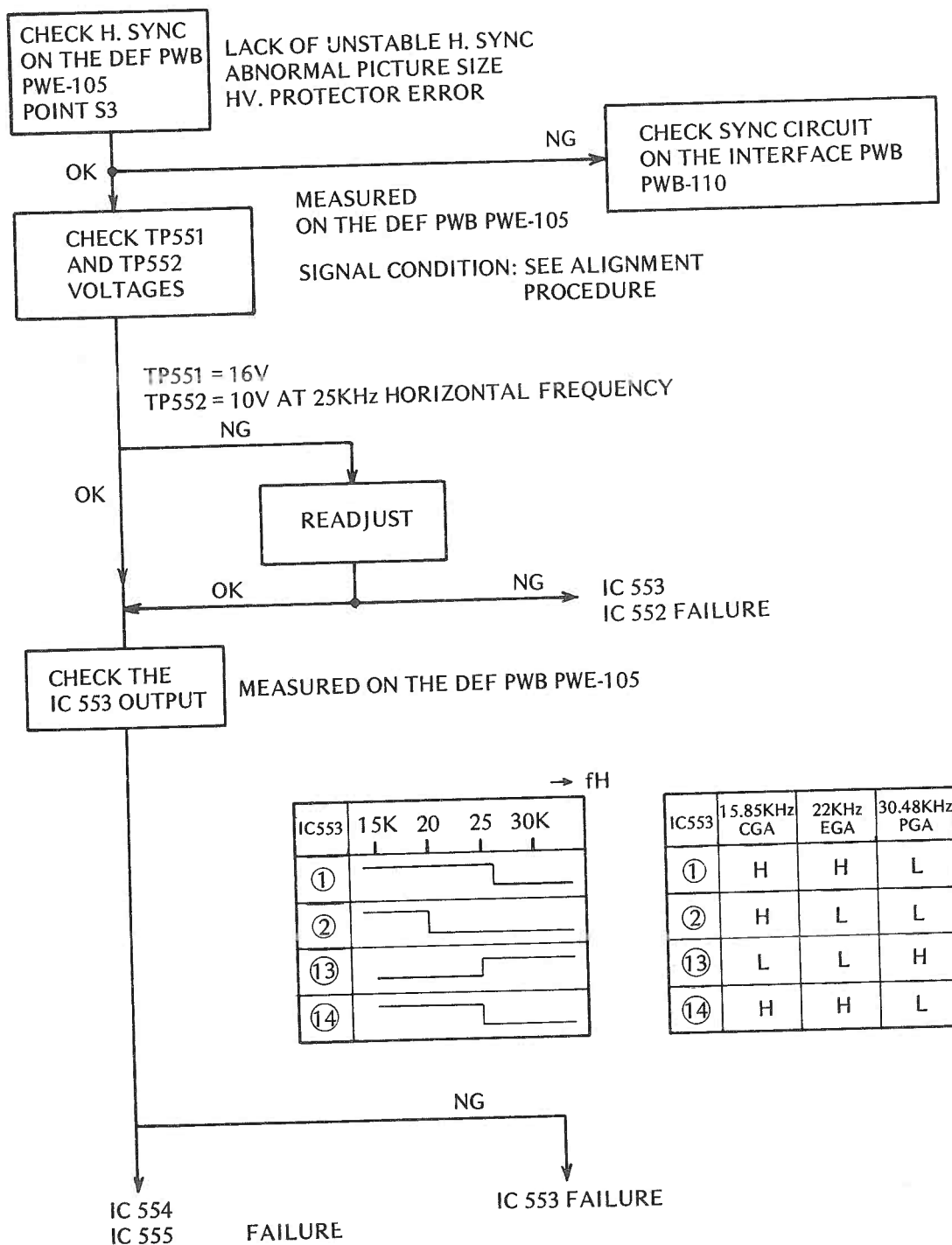


5. H. OSC/DEF/HV. CIRCUIT FAULT

NO RASTER
ABNORMAL PICTURE SIZE
ABNORMAL VIDEO ON THE CRT SCREEN

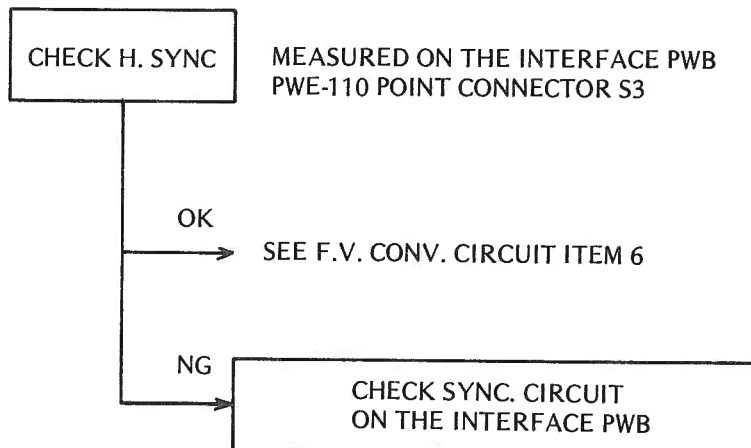


6. F-V CONVERTER AND ASSOCIATED CIRCUITRY

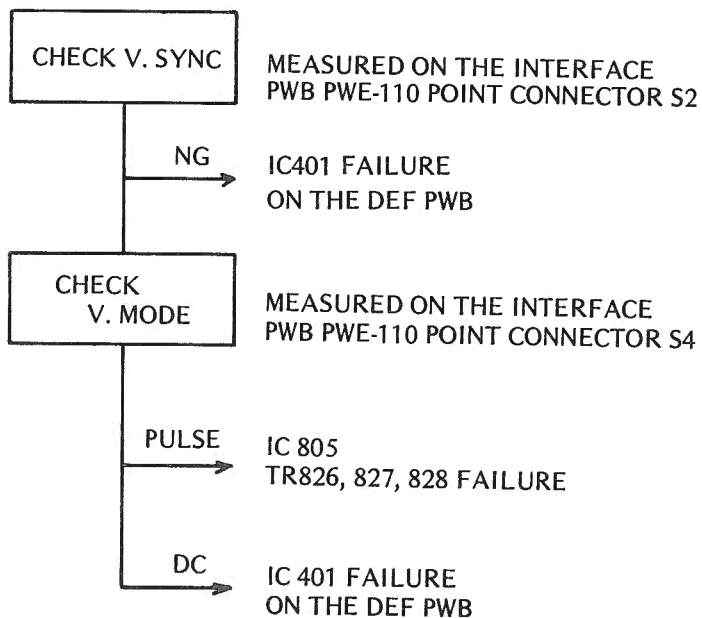


7. LACK OF UNSTABLE SYNCHRONIZATION

HORIZONTAL

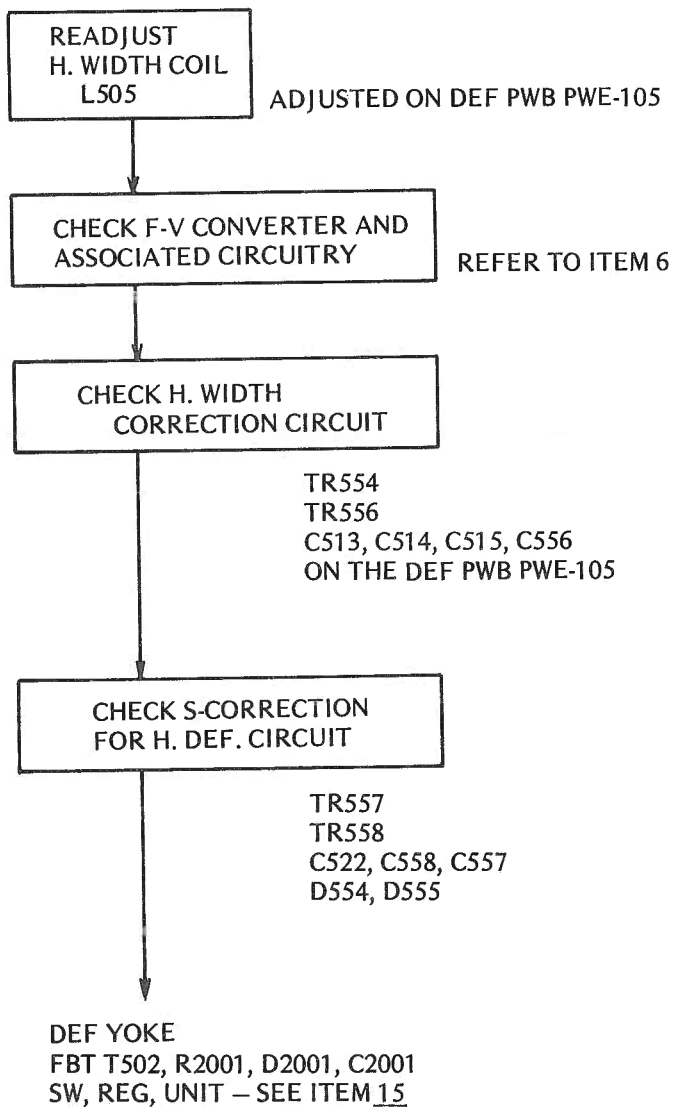


VERTICAL

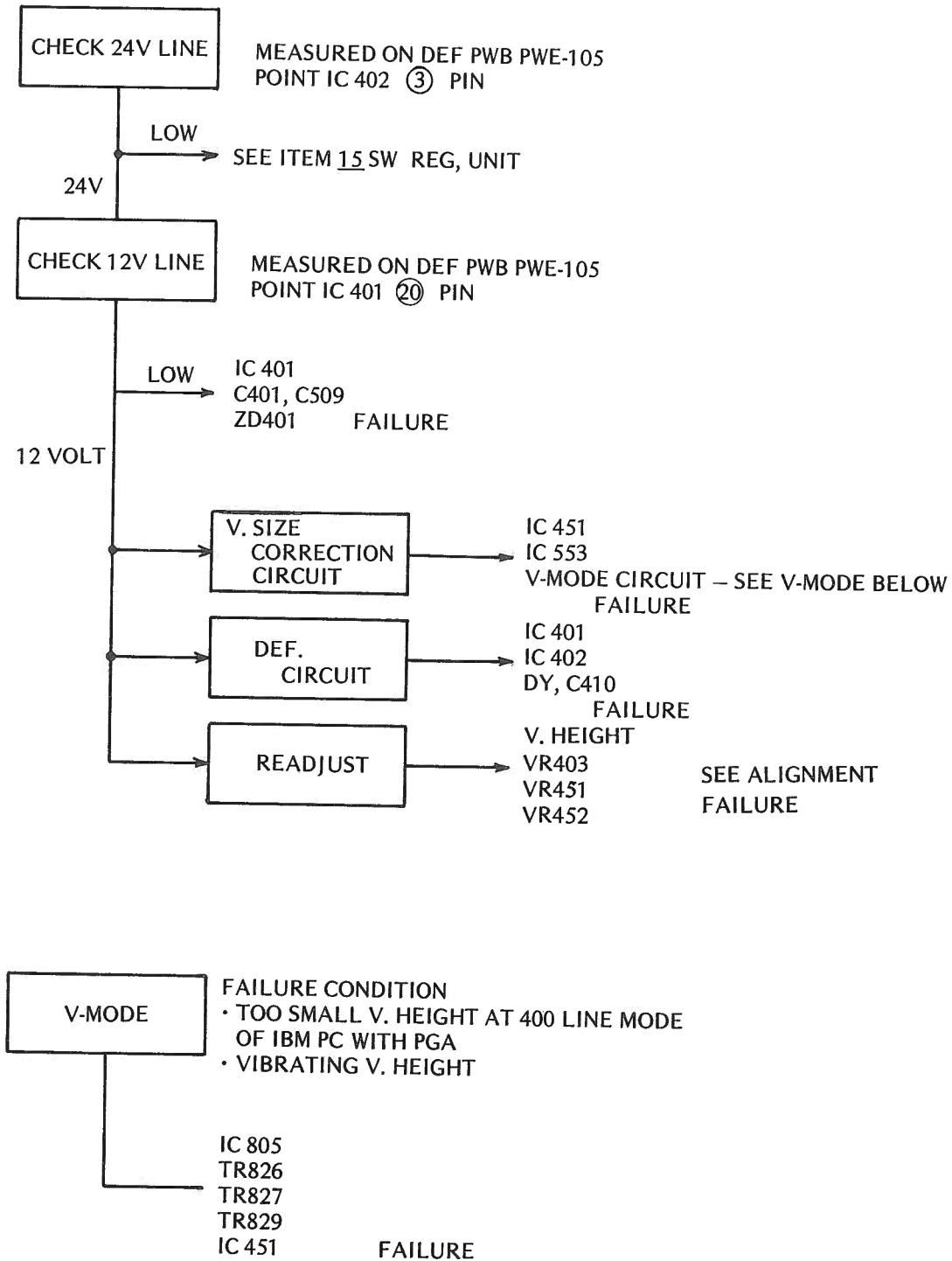


8. PICTURE SIZE

ABNORMAL HORIZONTAL WIDTH



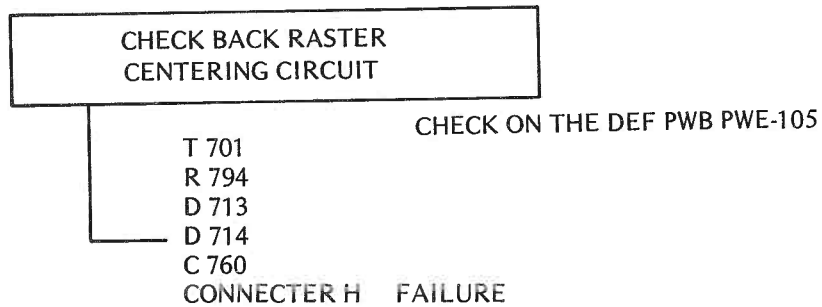
ABNORMAL VERTICAL HEIGHT



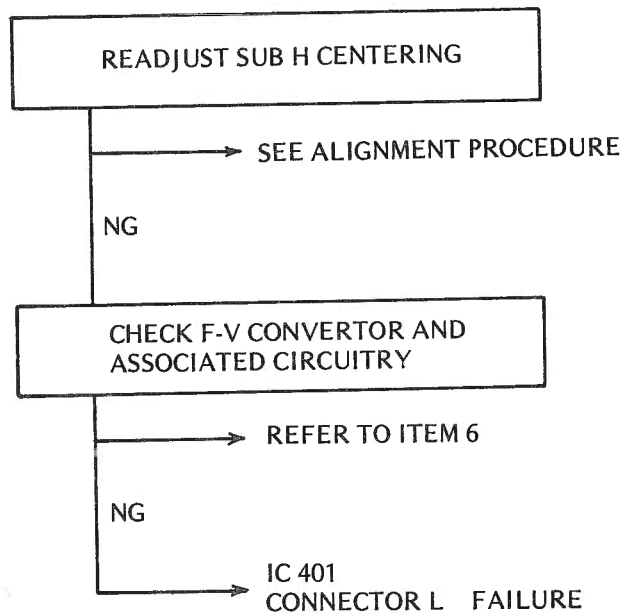
9. CENTERING

9-1. HORIZONTAL

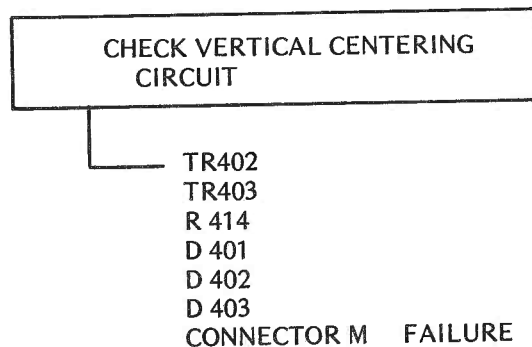
a) BACK RASTER CENTERING



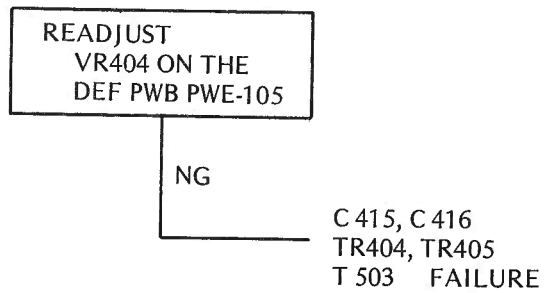
b) PICTURE CENTERING



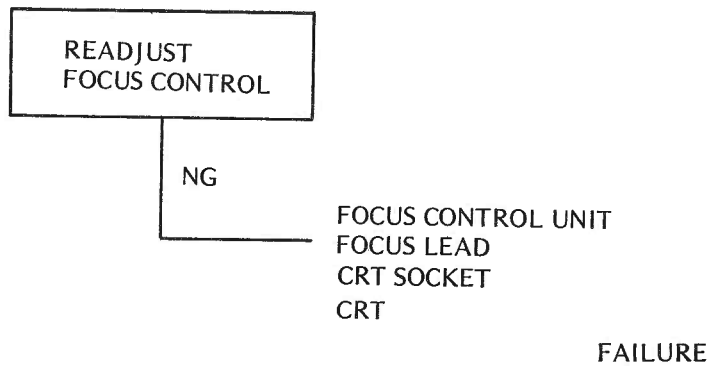
9-2. VERTICAL



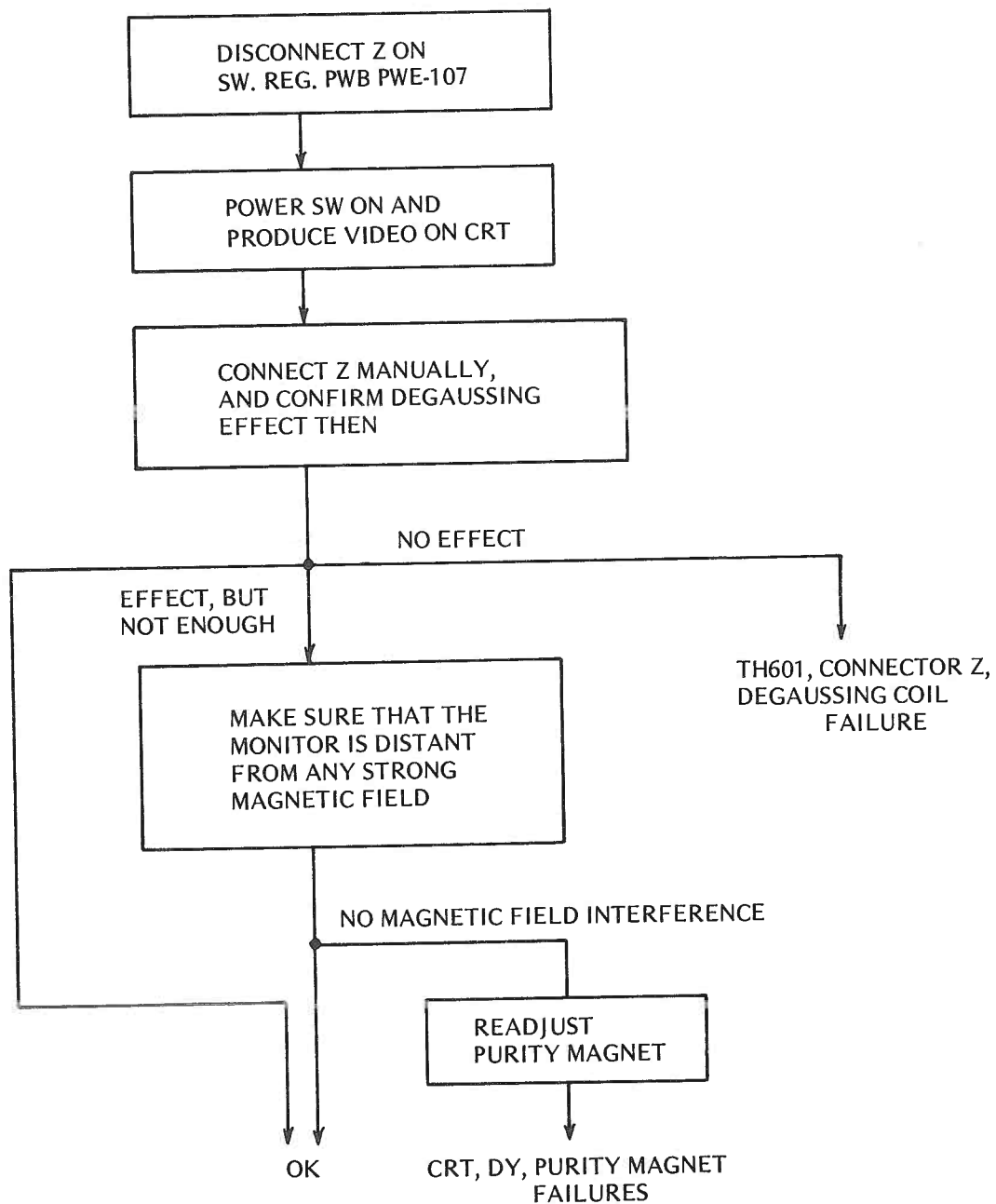
10. SIDE PINCUSHION DISTORTION FAILURE



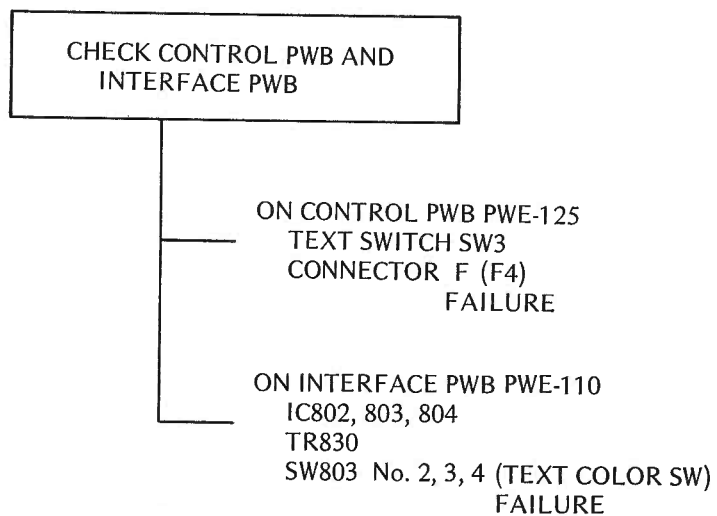
11. POOR FOCUS



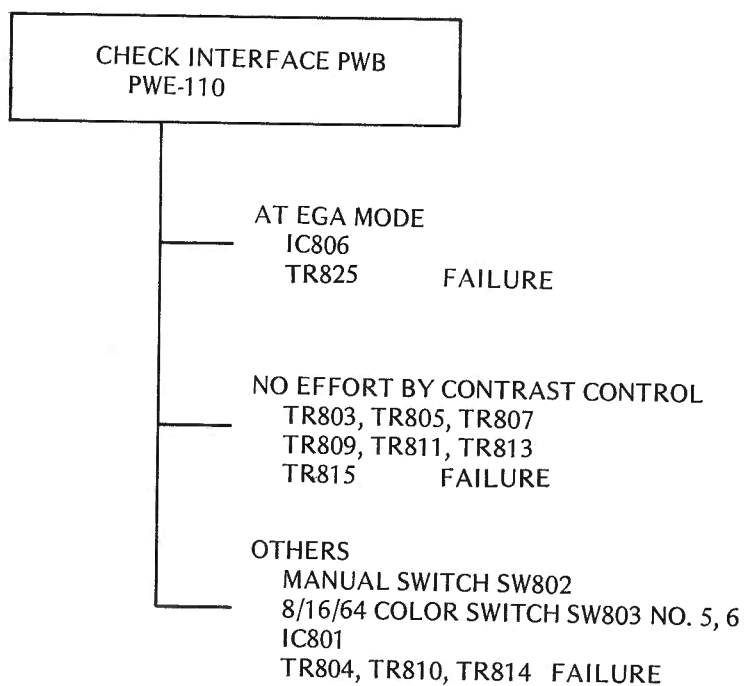
12. IMPURITY ON CRT SCREEN



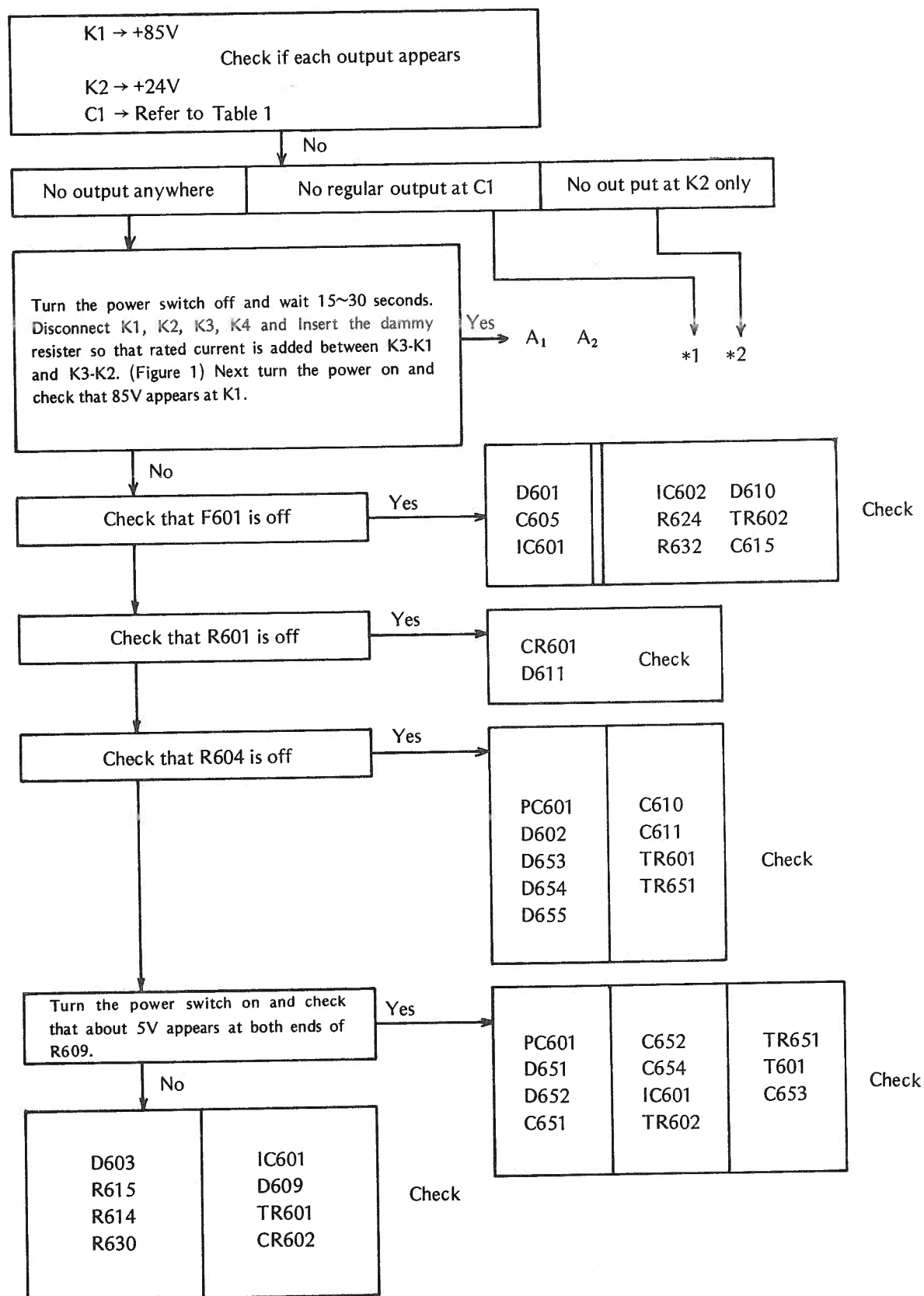
13. ABNORMAL TEXT MODE OPERATION

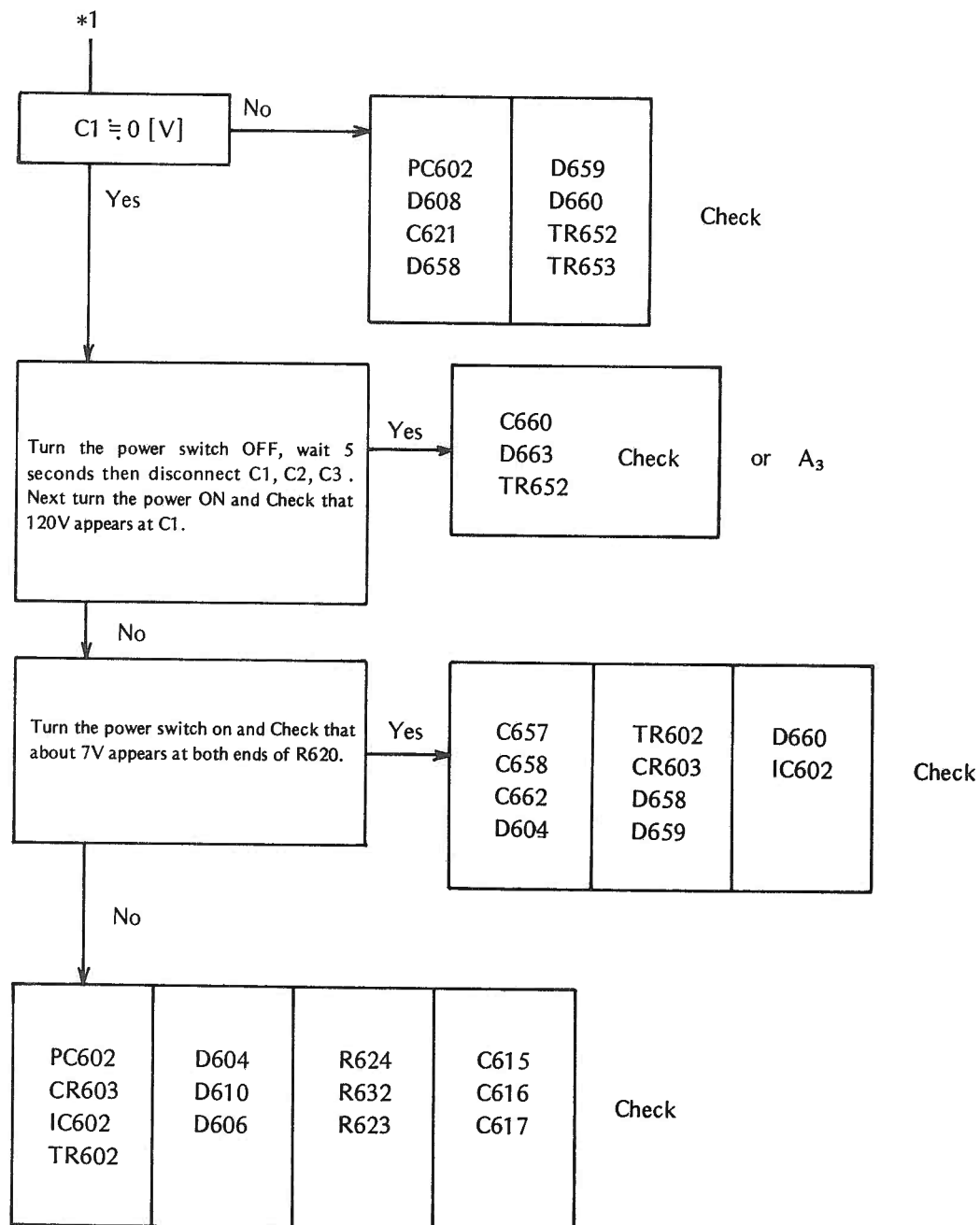


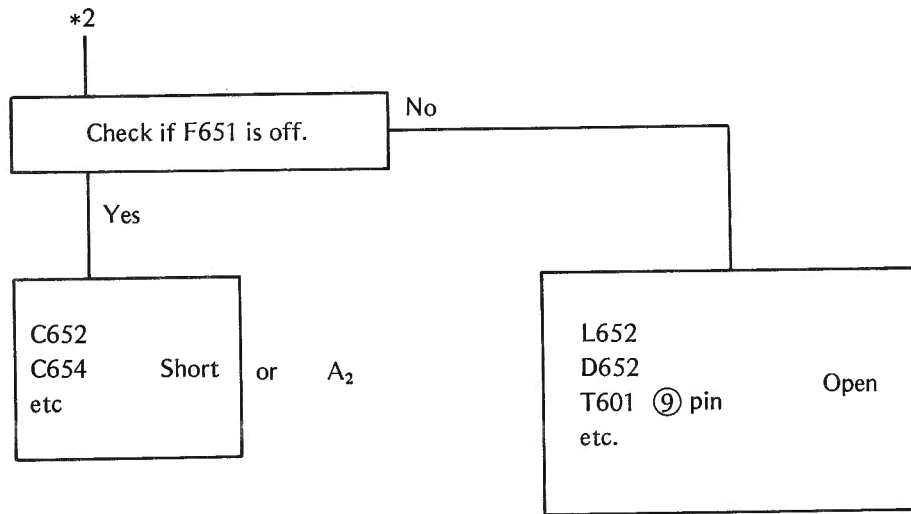
14. ABNORMAL COLOR AT TTL MODE



15. SWITCHING REGULATOR UNIT







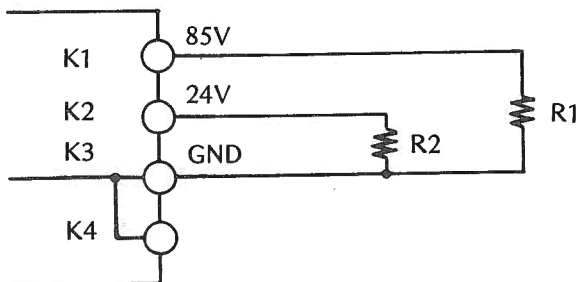
An Trouble excluding Switching Regulator (see next page)

Table 1. C1 output voltage

Horizontal Frequency [KHz]		C1 Voltage [V]
15.85	(CGA)	51 ± 2.6
22	(EGA)	64 ± 3.2
30.48	(PGA)	93 ± 4.7

With no input signal, about 45V should appears at C1.

Figure 1. Rated load current at K1 and K2 terminal



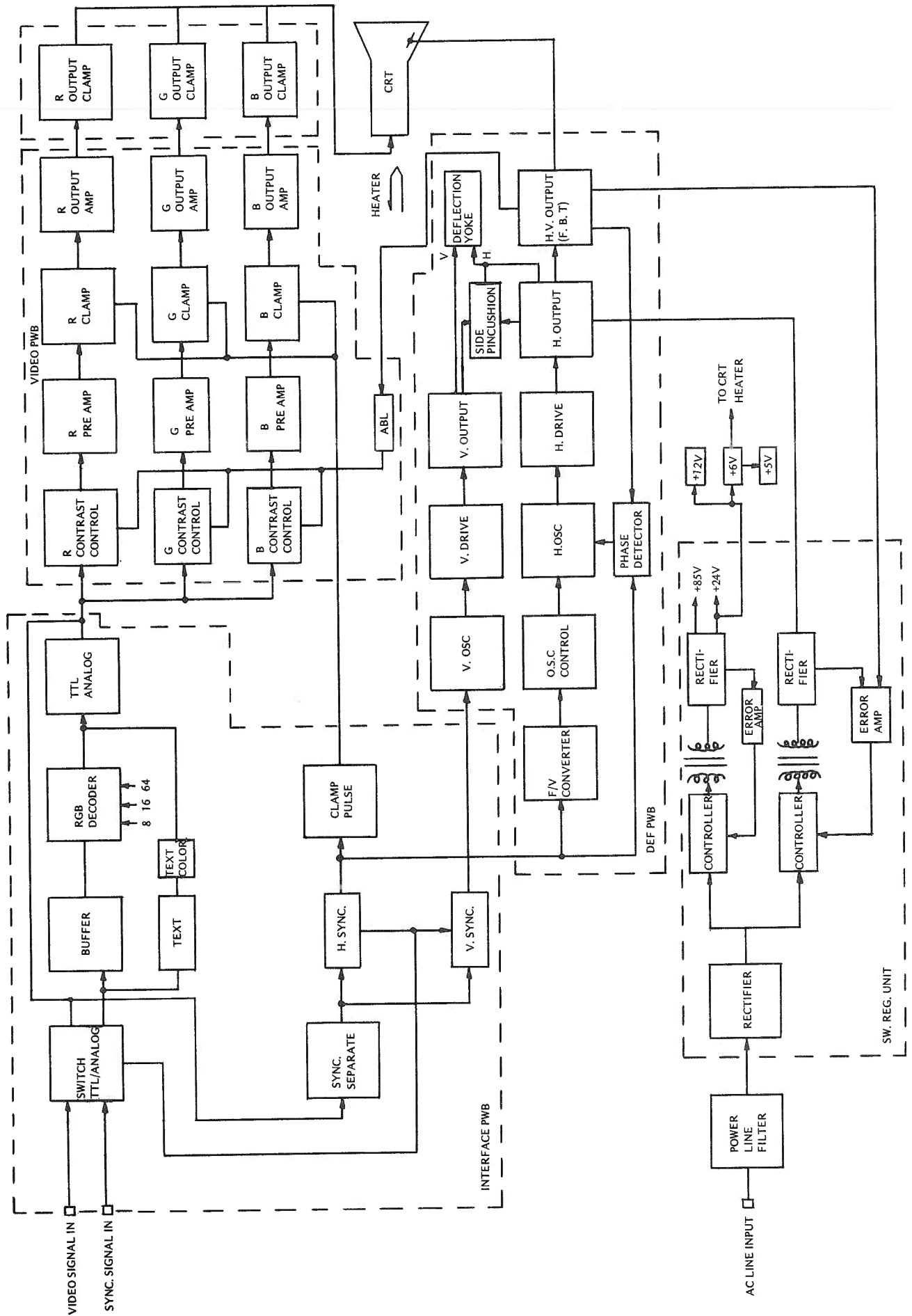
+85V	0.015 ~ 0.11A R1 (5.67K Ω ~ 772 Ω)
+24V	0.4 ~ 1.0 A R2 (60 Ω ~ 24 Ω)

Attention) Do not power on SW. REG. unit itself without the load at K1, K2,
or it may misoperate protector.

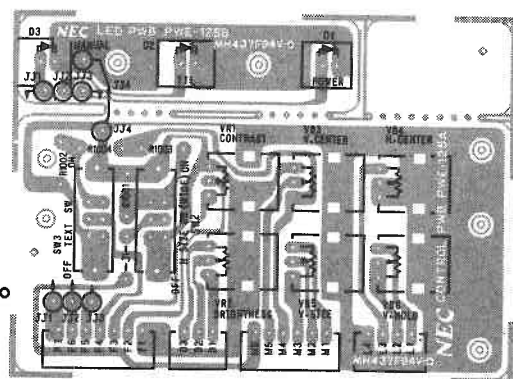
MAIN VOLTAGE LINE FAILURE EXCEPT SW. REG. UNIT

VOLTAGE LINE		FAILURE PARTS	PWB ASSY	REMARKS
(A1) 85V CONNECTOR K1-K3		D554, D555 TR501 TR502	DEF PWB PWE-105	
		TR728 ~ TR733 R770 ~ R775 C742, C743, C745	VIDEO PWB PWE-122	
(A2) 24V K2-K3 AND ASSOCI- ATED VOLTAGE LINES	24V CONNEC- TOR K2-K3	D404, IC402, C409	DEF PWB PWE-105	BECAUSE OF FAILURE BELOW PART MAY BE DAMAGE 1. F651 1.6A 2. R780 2.2Ω 1/2W 3. R781 4.7Ω 1/2W 4. TR741
		TR741, IC701, IC702 ZD702 C752, C758, C759, T501	VIDEO PWB PWE-122	
	12V CONNEC- TOR P3-P1	C704 ~ 706 AND ASSOCIATED CIRCUITRY OF VIDEO AMP CIRCUIT USING 12 Volts Supply	VIDEO PWB PWE-122	
		IC755 C810, C829, TR801 ZD801, C810	INTERFACE PWB PWE-110	
	6V CONNEC- TOR HC2-HC3	CRT HEATER	CRT PWB PWF-123	
		C759	VIDEO PWB PWE-122	
		INTERFACE CIRCUIT BASED ON 5V LINE BETWEEN CONNECTOR P4 AND P1 TTL ICs	INTERFACE PWB PWE-110	
(A3) 45 ~ 120V CONNECTOR C1-C3		C516 FBT D501 TR503 C513, C514, C515 DEFLECTION YOKE	DEF PWB PWE-105	
(A3) HIGH VOLTAGE FEEDBACK VOLTAGE CONNECTOR C2-C3		FBT C2001 D2001 OTHERS	DEF PWB PWE-105	SEE ITEM 5

JC-1401P3A BLOCK DIAGRAM



— Solder Side —



— Solder Side —

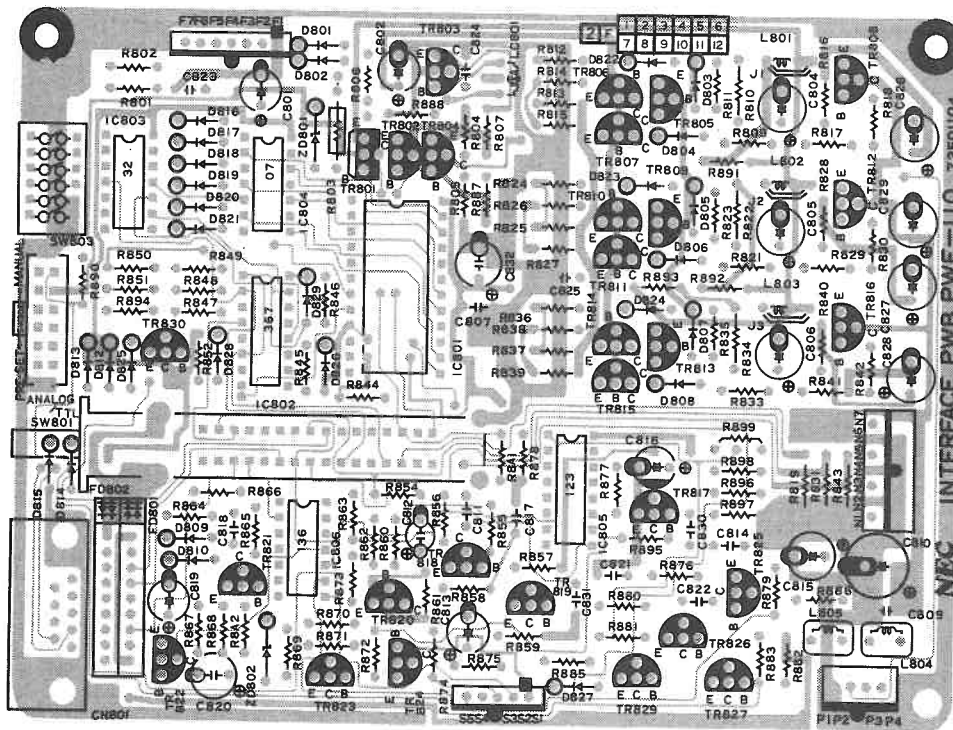


— Solder Side —



INTERFACE PWB ASS'Y (PWE 110)

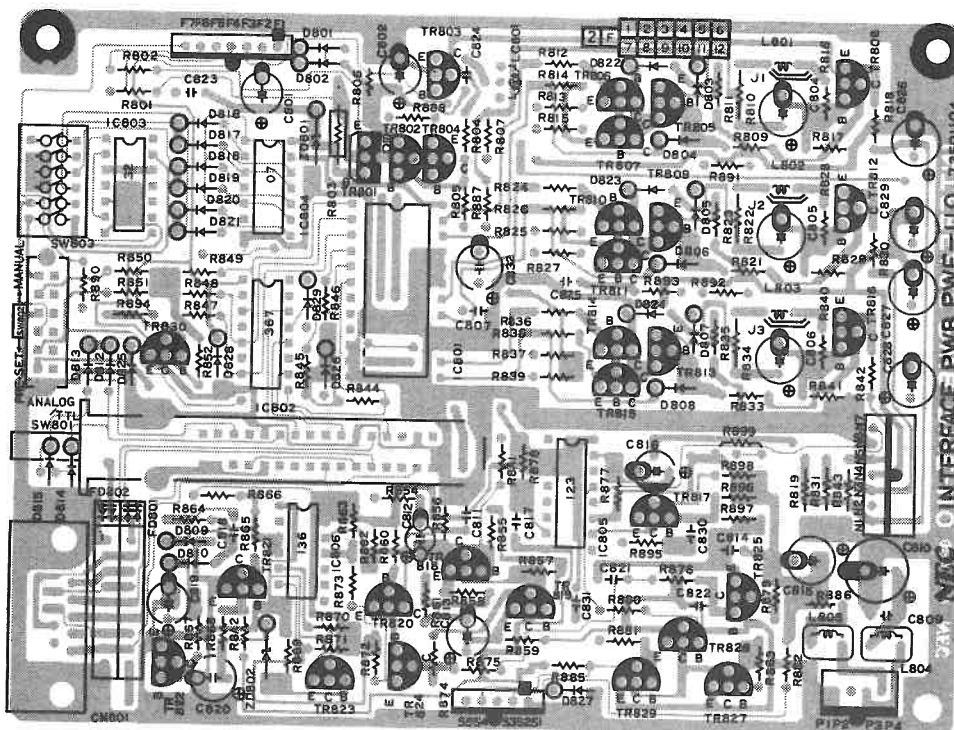
— Component Side —



↖ Pm 2 5V Vert +
Pm 3 8V Horiz -

INTERFACE PWB ASS'Y (PWE 110)

See-through view of reverse-side components



DEPI ACEMENT PARTS LIST

Replace only with Parts Number Specified.

[illegible]

SYMBOL	PARTS NO	DESCRIPTION	QTY
Δ ZD2001 Δ ZD2002 ZD551	360K3143	DIODE, RD8.2JSB(1)-T4	3
Δ D602	360K3149	DIODE RD10EB(2)-T4	1
Δ D655 Δ D660	360K3151	DIODE RD6.8EB(2)-T4	2
D716	36001009	DIODE, SI, 1S-2473	1
D826	36001027	DIODE 1SS132	2
ZD802	36003100	DIODE RD5.1EB-2	1
Δ D605	36003133	DIODE, RD7.5EB(2)	1
ZD552	36003147	DIODE RD18EB(1)	1
Δ D611	36003162	DIODE, RD2.7EB (1)	1
D2C01 Δ D2004 D404	361K7160	RECTIFIER, SI, TVR-06G G23	9
D505 Δ D554 Δ D555			
D713 D714 D715			
Δ D501	CGJ-1		1
Δ D603 Δ D606	361K7259	RECTIFIER, SI, ERE44-06V1	1
Δ D651	361K7505	RECTIFIER, SI, RU1P	1
D502	36107174	DIODE RU3AM, LFS2	2
Δ D652	36107268	RECTIFIER, SI V11N	1
Δ D657	36107511	RECTIFIER, SI, RL42, LFK2	1
Δ D601	36107512	RECTIFIER, SI, RG4C, LFK2	1
FD802	36108009	DIODE, RB-40C BRIDGE	1
	36108054	DIODE ARRAY 1S2473*7A	1
FD801	36108055	DIODE ARRAY 1S2473*7K	1
D1 D2 D3	36801046	DIODE, LIGHT-E S6235D	3
Δ D2002 Δ D2005	38005011	VARISTEP, VD1220	2
Δ TH601	38112026	THERMISTE, POSITIVE	1
Δ PC601 Δ PC602	38200214	PHOTO COUPLER	2

*** TRANSFORMERS ***			
T501	45803008	TRANSFORMER	1
T701	46305101	TRANS, CONVERTER	1
Δ T601	46308101	TRANS, SWITCHING	1
Δ T602	46308102	TRANS, SWITCHING	1
Δ T502	47105626	FLY BACK TRANSFORMER	1
Δ T503	47502042	TRANS, SIDE PINCUSHION	1

*** VARIABLE RESISTORS ***			
VP5	41011270	R, VARIABLE 8500-V(W)	1
VP1	41011271	R, VARIABLE 510K-V(W)	2
VP4	41011272	R, VARIABLE 510K-V(W)	1
VP3	41011273	R, VARIABLE 520K-V(W)	1
VP6	41011274	R, VARIABLE 620K-V(W)	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
VR401	41061006	R, VARIABLE B100K	1
VR707	41061008	R, VARIABLE B4.7K	1
VR402	41061013	R, VARIABLE B220H	2
VR405	41061623	R, VARIABLE 73K	1
VR552	41067027	R, VARIABLE B3K	1
VR551	41067105	R, VARIABLE 1K 0.1W	1
VR502	41067108	R, VARIABLE 25K	1
VR701	VR703	R, VARIABLE B3.3K	3
VR704	VR706	R, VARIABLE B4.7K	3
VR901	VR902	R, VARIABLE B100K	6
VR904	VR905		
VR451	VR452	R, VARIABLE B1K	2
VR553	VR554	R, VARIABLE B50K	2
VR501	41085012	R, VARIABLE B300K	1
VR555	41085015	R, VARIABLE B500K	1
VR404	41085016	R, VARIABLE B500H	1
Δ VR651	41087058	R, VARIABLE B5K	1
Δ VR2002 Δ VR2003	VR652	R, VARIABLE B2K	3
Δ VR653	41505005	R, VARIABLE B5K	1
Δ VR2001	41505007	R, VARIABLE B10K	1
	41505008		
*** RELAYS & SWITCHES ***			
SW802	65163001	SWITCH, SLIDE	1
Δ SW2	65163002	SWITCH, SLIDE	2
SW801	65169901	LEVER SWITCH, SLIDE	1
	65208004	SEE SAW SWITCH	1
Δ SW803	66098006	SW, LEVER SDR66CP	1
*** COILS & FILTERS ***			
Δ L505	60908043	COIL, VARIABLE WIDTH	1
Δ L504	60918101	COIL, H.LIN	1
Δ L507	60999004	COIL, CHOKE	1
L901	610E1711	COIL, FILTER 3.3UH	3
L716	L805	COIL, FILTER 5.6UH	3
	L804		
L502	L714	COIL, FILTER 5.6UH	2
L503	610F7010	COIL, FILTER 2.7UH	1
L712	61022081	COIL (SF471M1R0)	1
L701	L703	COIL, FILTER 1.5UH	3
L704	L705	COIL, FILTER 2.7UH	3
L707	L708		
Δ L601	61062038	LINE FILTER (3.9MH-2.2A)	1
Δ L501	61062057	LINE FILTER	1
	L717	COIL, FILTER 50UH	3
	L711		
	L709		
	61051710		
	610F6014		
	61022081		
	61051707		
	61051710		
	61062038		
	61062057		
	61064006		

SYMBOL	PARTS NO	DESCRIPTION	QTY
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Δ L651 L713 L715	61099011	COIL, CHOKO 33UH	2
	61099019	COIL, CHOKO	2
Δ L652	61099020	COIL, CHOKO	1
	61314108	COIL, DEGAUSSING	1
Δ LC401 LC801	61606022	NOIZE FILTER DSS-222M	1
	61606023	FILTER DSS-223S	1

*** PWB ASSYS ***			
	84J57A03	SW. REG. PWB ASSY	1
	84J57C03	VIDEO PWB ASSY	1
	84J57D02	DEF PWB ASSY	1
	84J57J02	CRT PWB ASSY	1
	84J57K03	INTERFACE PWB ASSY	1
	84J57L01	CONTROL PWB ASSY	1

*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***			
HS-402 Δ F651 Δ F601 SG901 SG904	31709201	INSULATOR SHEET	1
	31709202	SHEET, INSULATOR	1
	66653013	FUSE 1.6A UC	1
	66653031	FUSE 3A UC	1
	66706001	SPARK GAP 1.2KV	5
Δ CN-CE CN-H CN-H1	70032223	SG/CRT SOCKET	1
	70102009	SOCKET, IC 24PIN	1
	70810707	POWER CORD (UL)	1
	71205037	HOLDER, FUSE	4
	73721003	CONNECTOR PIN 2P	3
	73293013	CABLE, SIGNAL	1

*** APPEARANCE PARTS ***			
	24514792	COIL SPPING	1
	25305821	CABINET BACK	1
	25305831	CABINET FRONT	1
	25404031	ESCUTCHEON, CONTROL	1
	25404091	REVOLVING STAND (E)	1
	25761881	NAME PLATE, INSTRUCTION	1
	25404111	REVOLVING STAND (T)	1
	25404121	LID, CONTROL	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
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*** PRINTED & PACKING MATERIALS ***			
	24806961	SAG, POLYETHYLENE (270*370)	1
	24813191	SAG, POLYETHYLENE	1
	25810221	FILLER (L), CARTON	1
	25810231	FILLER (R), CARTON	1
	25810241	CARTON BOX	1
	25810711	FILLER (T), CARTON	1
	78117552	USER'S MANUAL	1
	78117561	JC-1401P3A QUESTIONARE	1
	78033751	HEW RECORDING CARD	1
	78041522	WARRANTY CARD	1
	599910248	SERVICE MANUAL	1

*** RESISTORS ***			
Δ R594 Δ R626 Δ R652	401C6649	R, CARBON 100K 5% 1/4W	1
	401C6657	R, CARBON 220K 5% 1/4W	1
	401C6661	R, CARBON 330K 5% 1/4W	1
Δ R602 Δ R619 Δ R609 Δ R622 Δ R662 Δ R631	401C6673	R, CARBON 1.0K 5% 1/4W	5
	401C6675	R, CARBON 1.2K 5% 1/4W	2
	401C6677	R, CARBON 1.5K 5% 1/4W	1
Δ R666 Δ R633 Δ R612 Δ R636 Δ R664	401C6679	R, CARBON 1.8K 5% 1/4W	1
	401C6681	R, CARBON 2.2K 5% 1/4W	1
	401C6683	R, CARBON 2.7K 5% 1/4W	1
Δ R627 Δ R657 Δ R618	401C6685	R, CARBON 3.3K 5% 1/4W	3
	401C6687	R, CARBON 3.9K 5% 1/4W	1
	401C6691	R, CARBON 5.6K 5% 1/4W	2
Δ R605 Δ R603	401C6695	R, CARBON 8.2K 5% 1/4W	1
	401C6709	R, CARBON 33K 5% 1/4W	1
Δ R2C02 R736	401C6723	R, CARBON 120K 5% 1/4W	1
	401C6745	R, CARBON 1.0M 5% 1/4W	1
	401H5721	R, CARBON 100K 5% 1/2W	1
Δ R2C05 R556 R587	401H5735	R, CARBON 390K 5% 1/2W	1
	401K5679	R, CARBON 1.8K 5% 1/6W	5
	401K5687	R, CARBON 3.9K 5% 1/6W	7
Δ R2C04 R591	401K5693	R, CARBON 6.8K 5% 1/6W	4
	401K5697	R, CARBON 10K 5% 1/6W	18
	401K5735	R, CARBON 10K 5% 1/6W	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
R592 R733 R854 R852 R920 R2011 R921	R731 R841 R875 R506 R868	401K5699 R-CARBON 12K 5% 1/6W	4
ΔR5E7 ΔR414 ΔR630 ΔR614 ΔR623 ΔR794 ΔR770 ΔR773 ΔR781	40175117 40175133 40175143 40175181 40175189 40177109 40177141 40177141 40178117	R-CARBON 4.7H 5% 1/4W R-CARBON 22H 5% 1/4W R-CARBON 56H 5% 1/4W R-CARBON 2.2K 5% 1/4W R-CARBON 4.7K 5% 1/4W R-CARBON 2.2H 5% 1/4W R-CARBON 47H 5% 1/4W R-CARBON 4.7H 5% 1/2W	1 1 3 1 1 1 6 1
ΔR601 R767 R526 R803 ΔR615	R768 R769	R-WIRE 10H 10% 2W R-METAL 1.8K 5% 5W R-METAL 33H 5% 1W R-METAL 330H 5% 1W R-METAL 1.0H 5% 2W	1 3 1 1 2
R407 ΔR622 ΔR616 ΔR607 R401	R667 ΔR625 R413	40372113 40372137 40372141 40372147 40372157	1 2 2 1 2
ΔR652 ΔR654 ΔR665 ΔR617 ΔR613	40372203 40372205 40372209 40372217 40373133	R-METAL 18K 5% 2W R-METAL 22K 5% 2W R-METAL 33K 5% 2W R-METAL 68K 5% 2W R-METAL 22H 5% 3W	1 1 1 2 1
R519 R520 ΔR653 ΔR660 ΔR659	40373163 40373165 40373195 40373197 40373203	R-METAL 290H 5% 3W R-METAL 470H 5% 3W R-METAL 8.2K 5% 3W R-METAL 10K 5% 3W R-METAL 18K 5% 3W	1 1 1 1 2
ΔR604	40399031	R-METAL 2.2K 5% 2W	1
ΔR2001 ΔR522	ΔR2007 ΔR523	R-METAL 2.2H 5% 1/4W R-METAL 4.7H 5% 1/4W	3 1
ΔR525 ΔR524 ΔR780	40812661 40812665 40822609	R-FUSE 330H 5% 1/2W R-FUSE 470H 5% 1/2W R-FUSE 2.2H 5% 1/2W	1 1 1

SYMBOL	PARTS NO	DESCRIPTION	QTY
C412 C524 ΔC521 C411 ΔC520 C512 C914 C905 C908 C511 C911 ΔC626 C740 C910 ΔC606 ΔC603 ΔC602 ΔC663 ΔC612 ΔC623 C559 C809 C419 ΔC561 C709 C718 C721 C736 C818 C825 C916 C568 C1001 C501 C503 C811 C830 C713 C737 C563 C508 C502 C404 C405 C403 C817	420C9551 420C9555 420C9557 420C9560 420C9563 420C9567 4201J575 42019175 4203J554 4203J575 42034143 42033013 42033067 42033125 42099082 42099085 421AC425 4210C213 421J9C01 4213K211 4219J002 423A1045 423A1055 423A1074 423A2023 423A2037 423A2043 427A7005 427A7007 427F4005 427F4010 427F4017 427F4025 427F4051	C-CERAMIC 500V 100PF C-CERAMIC 500V 220PF C-CERAMIC 500V 330UF C-CERAMIC 500V 560PF C-CERAMIC 500V 0.001UF C-CERAMIC 500V 2200PF C-CERAMIC 500V 0.01UF C-CERAMIC 2KV 0.01UF C-CERAMIC 500V 180PF C-CERAMIC 500V 0.01UF C-CERAMIC 2KV 1000PF C-CERAMIC 400V 1000PF C-CERAMIC 400V 2200PF C-CERAMIC 400V 0.01UF C-CERAMIC 2KV 1500PF C-CERAMIC 2KV 560PF C-CERAMIC 50V 0.01UF C-CERAMIC 50V 1000PF C-CERAMIC 50V 0.1UF C-CERAMIC 50V 680PF C-CERAMIC 50V 0.1UF C-CERAMIC 50V 100PF C-CERAMIC 50V 270PF C-CERAMIC 50V 270PF C-CERAMIC 50V 12PF C-CERAMIC 50V 47PF C-CERAMIC 50V 82PF C-FILM 100V 0.0022UF C-FILM 100V 0.0033UF C-FILM 50V 2200PF C-FILM 50V 5600PF C-FILM 50V 0.022UF C-FILM 50V 0.1UF C-FILM 50V 1000PF	1 1 1 4 4 4 1 1 1 1 3 1 1 2 1 1 6 5 3 22 1 1 2 1 1 1 3 3 1 1 1 1 1 1 1 1 2

*** CAPACITORS ***

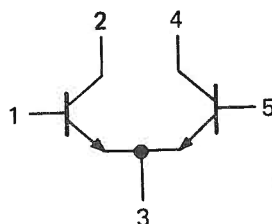
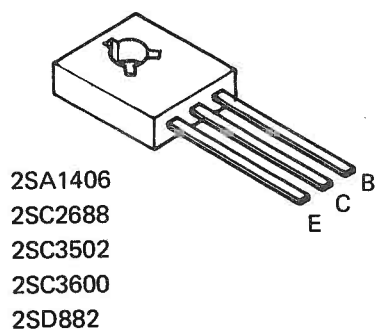
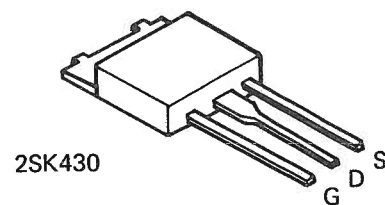
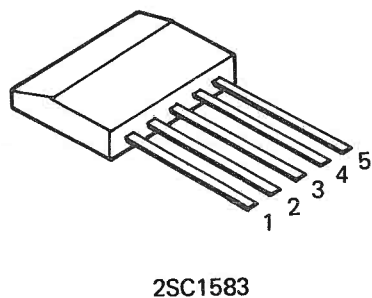
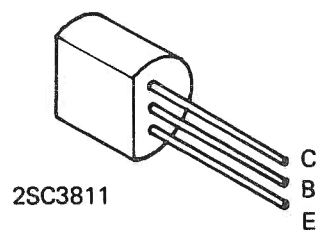
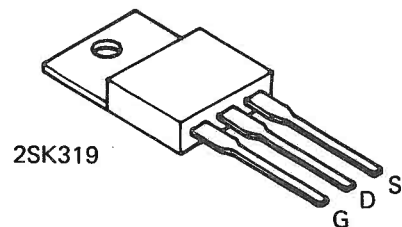
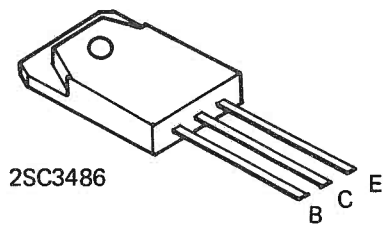
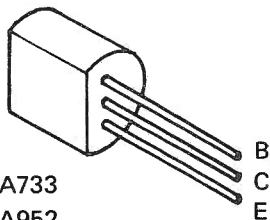
SYMBOL	PARTS NO	DESCRIPTION	QTY
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ΔC610	ΔC616	C-ELEC 50V 470UF	2
ΔC654	4302E090	C-ELEC 35V 100UF	1
ΔC652	4302E093	C-ELEC 35V 470UF	1
ΔC609	4302E105	C-ELEC 50V 4.7UF	2
ΔC620	4302E107	C-ELEC 50V 22UF	2
ΔC653	4302E170	C-ELEC 100V 100UF	1
C516	4300J040	C-ELEC 160V 10UF	1
ΔC605	4310E101	C-ELEC 200V 470UF	1

SYMBOL	PARTS NO	DESCRIPTION	QTY
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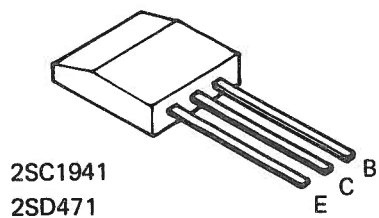
C402	427F4052	C-FILM 50V 1200PF	1
C551	427F4053	C-FILM 50V 1500PF	2
C566	427F4058	C-FILM 50V 3900PF	1
C417	427F4059	C-FILM 50V 4700PF	1
C504	427F4061	C-FILM 50V 6800PF	1
C506	427F4063	C-FILM 50V 0.01UF	5
C732	427F4071	C-FILM 50V 0.047UF	1
C406	427F4075	C-FILM 50V 0.1UF	2
C421	42703867	C-FILM 400V 0.022UF	1
ΔC515	42754267	C-FILM 200V 0.022UF	1
C517	4276D063	C-FILM 50V 0.01UF	2
ΔC608	4276D073	C-FILM 50V 0.068UF	1
ΔC656	4276D075	C-FILM 50V 0.1UF	1
ΔC607	4279J058	C-FILM 100V 5600PF	1
ΔC655	42807514	C-METAL FILM 1.6K 3600PF	1
ΔC513	42807516	C-METAL FILM 1.6K 4300PF	1
ΔC514	42807517	C-METAL FILM 1.6K 4700PF	1
ΔC526	4282C025	C-METAL FILM 50V 1UF	1
C528	42824229	C-METAL FILM 250V 0.22UF	1
ΔC601	42839021	C-METAL FILM 250V 0.068UF	1
ΔC661	42839022	C-METAL FILM 250V 0.1UF	3
ΔC613	42899010	C-METAL FILM 250V 0.22UF	3
C901	42899012	C-METAL FILM 1KV 0.068UF	1
C523	42899042	C-METAL FILM 400V 0.64UF	3
ΔC522	430A4103	C-ELEC 50V 0.47UF	3
C728	430A4105	C-ELEC 50V 1UF	2
C505	430A9015	C-ELEC 10V 47UF	2
ΔC2002	430A9061	C-ELEC 50V 1UF	2
C763	430A9062	C-ELEC 50V 2.2UF	1
C820	430A9065	C-ELEC 50V 10UF	1
ΔC2004	430B3102	C-ELEC 50V 1UF	1
C415	430B3109	C-ELEC 50V 47UF	1
ΔC2001	430B3182	C-ELEC 160V 1UF	2
C743	430K5116	C-ELEC 160V 1UF	1
C742	430K5135	C-ELEC 200V 10UF	1
C518	4302C101	C-ELEC 50V 0.47UF	1
ΔC660	4302C107	C-ELEC 50V 22UF	1
C519	4302C172	C-ELEC 100V 330UF	1
ΔC651	4302C182	C-ELEC 160V 1UF	1
ΔC664	4302C190	C-ELEC 160V 100UF	3
ΔC657	4302E051	C-ELEC 16V 220UF	2
ΔC611			

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2SA952
2SA953
2SA1018
2SC945
2SC1473
2SC1730
2SC2001

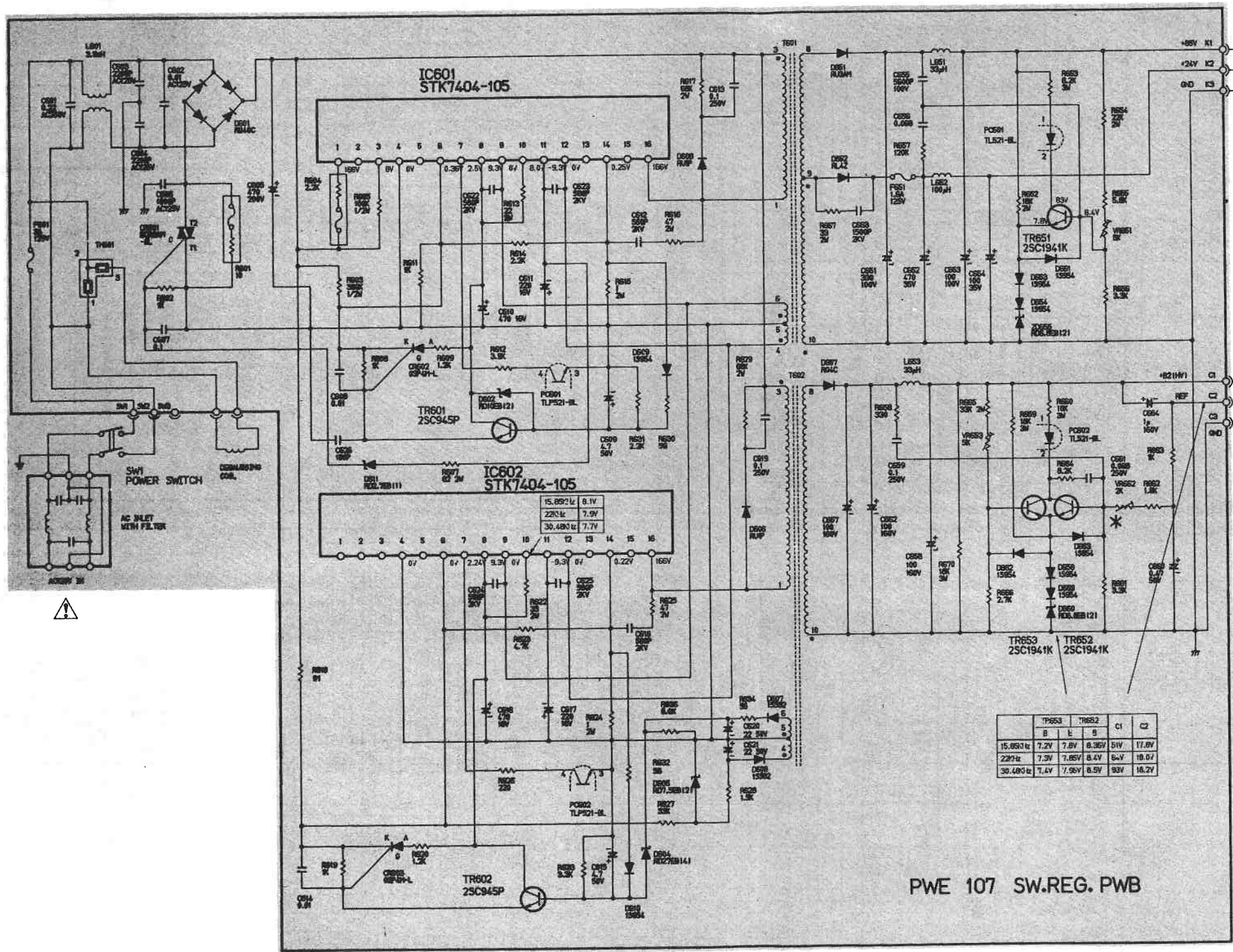


NOTE:

E: EMITTER
B: BASE
C: COLLECTOR
G: GATE
D: DRAIN
S: SOURCE



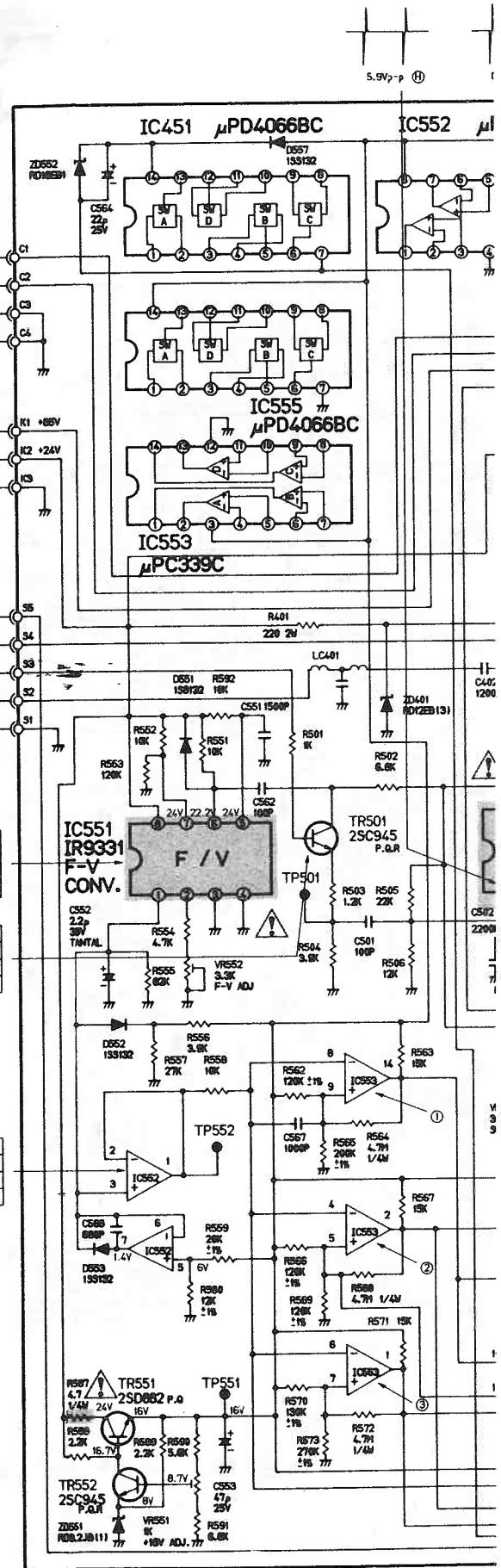
MODEL JC-1401P3A
SCHEMATIC DIAGRAM

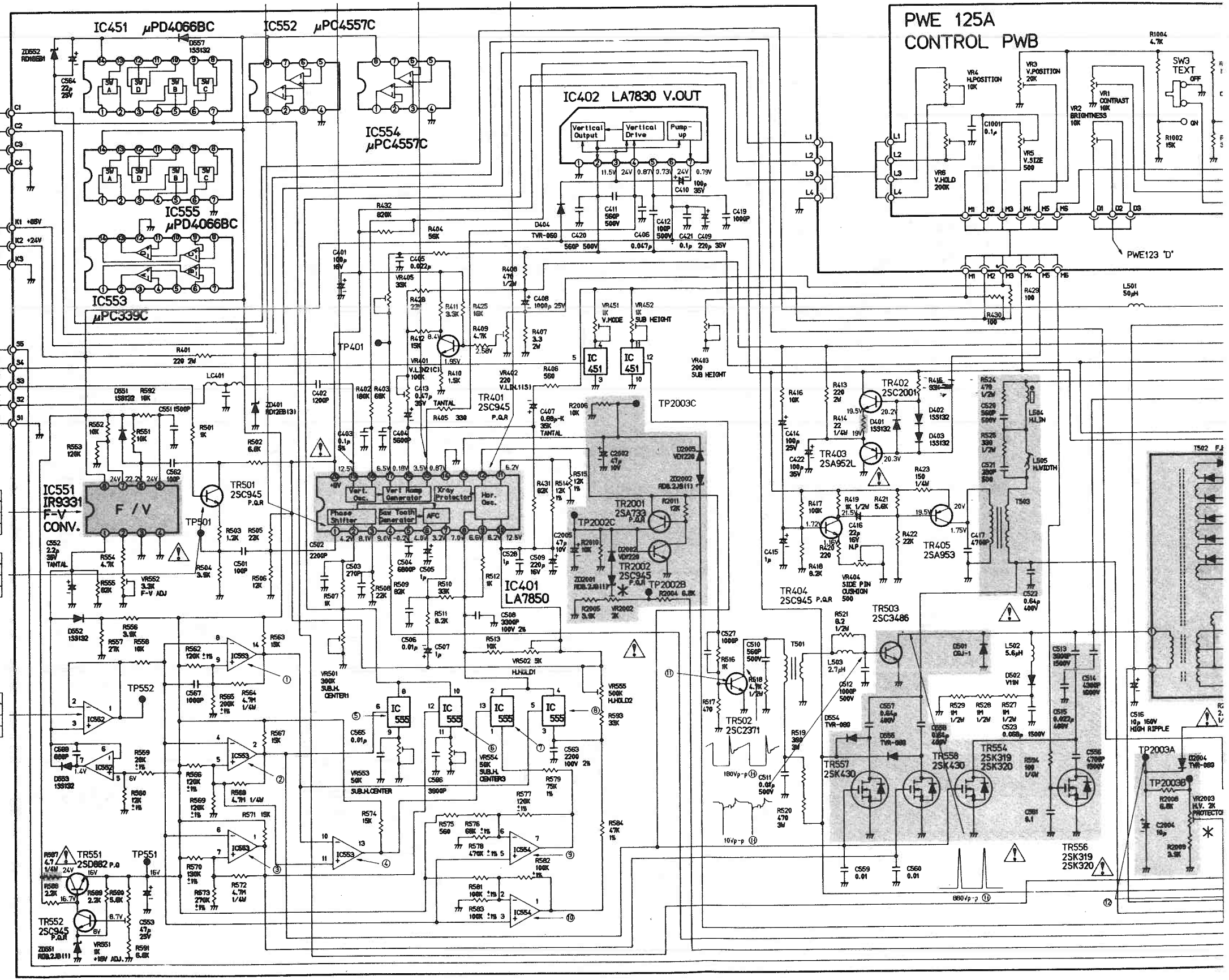


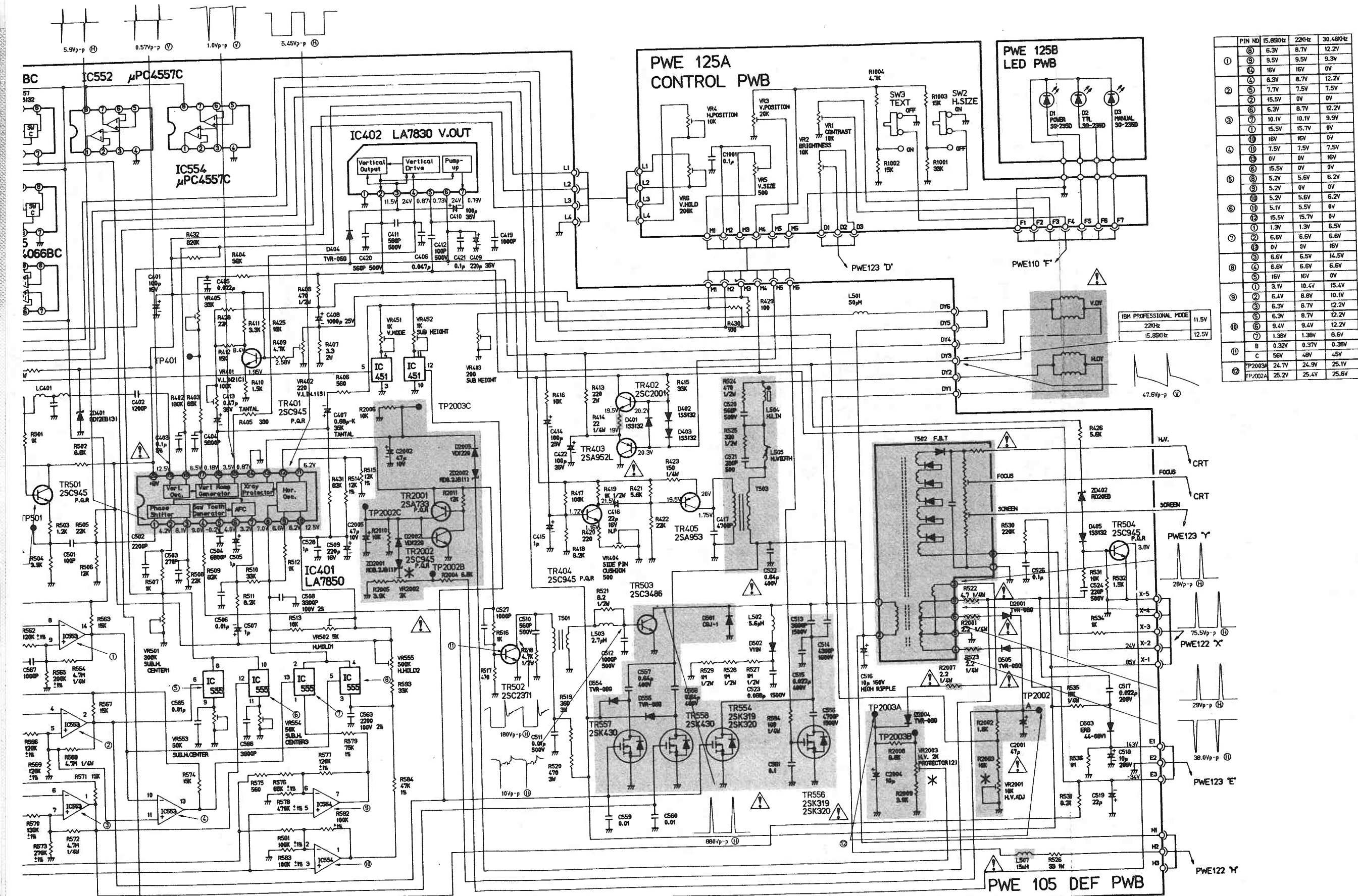
	①	②	③
15.850 Hz	6V	1.9V	2.9V
220 Hz	8.2V	1.88V	4.0V
30.480 Hz	11.5V	1.88V	5.5V

	B	C	E
15.850 Hz	7.0V	7.4V	6.4V
220 Hz	6.5V	7.6V	6.0V
30.480 Hz	6.1V	7.8V	5.6V

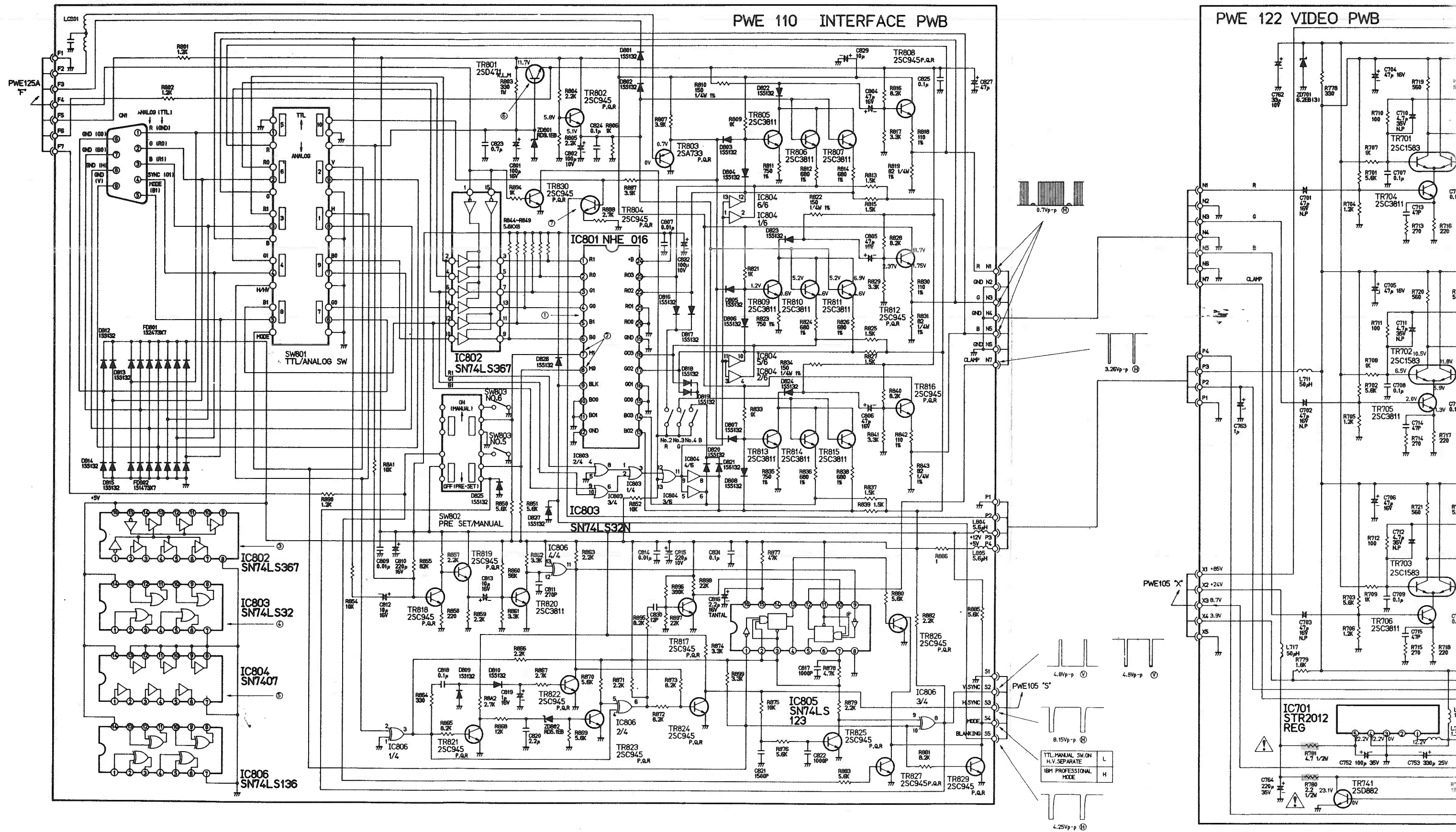
	①	②	③
15.850 Hz	6.3V	6.3V	6.0V
220 Hz	8.7V	8.7V	8.2V
30.480 Hz	12.2V	12.2V	11.5V

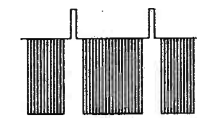




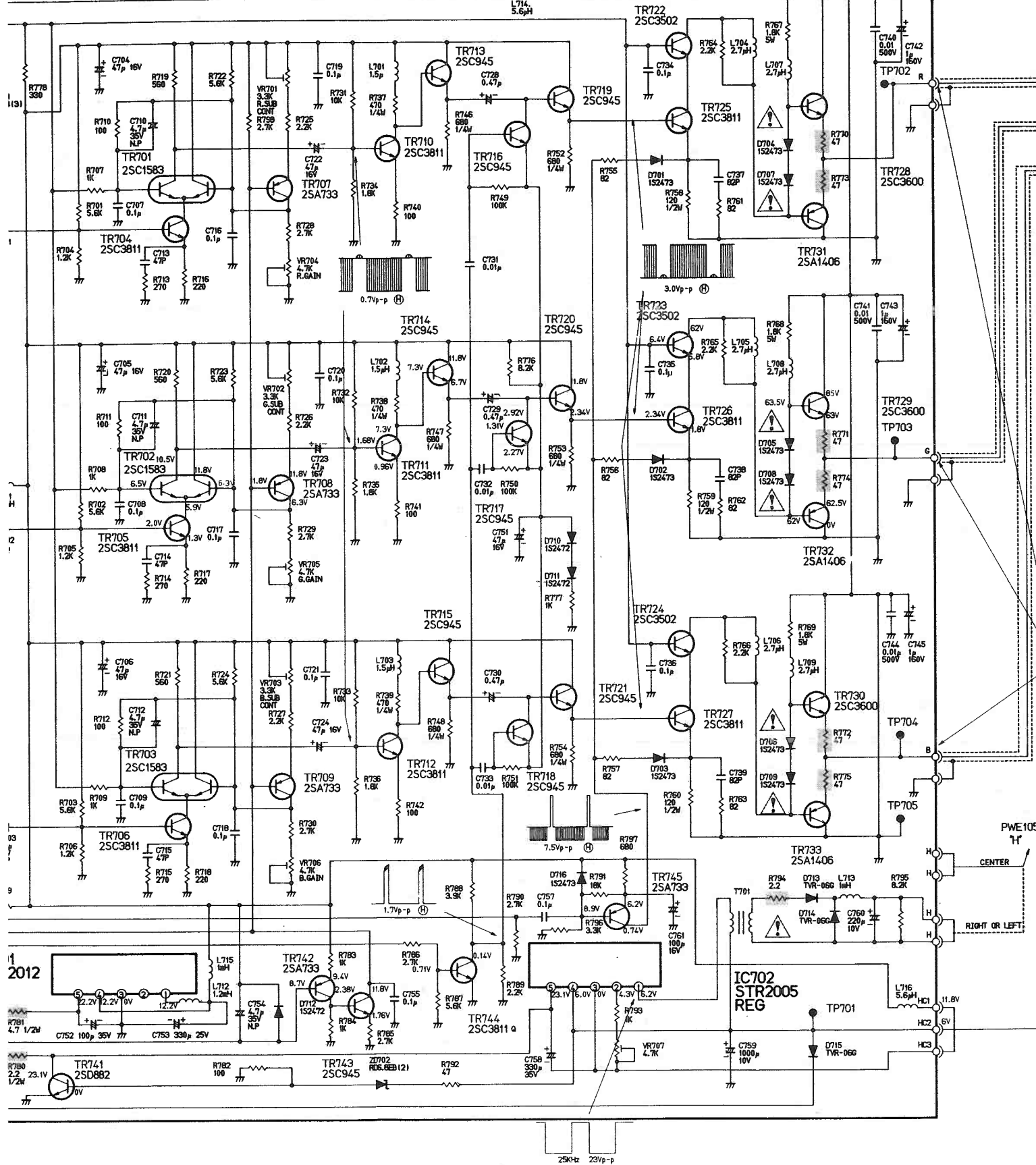


PIN NO.	15.850Hz	220Hz	30.480Hz
①	6.3V	8.7V	12.2V
②	9.5V	9.5V	9.3V
③	16V	16V	0V
④	6.3V	8.7V	12.2V
⑤	7.7V	7.5V	7.5V
⑥	15.5V	0V	0V
⑦	6.3V	8.7V	12.2V
⑧	10.1V	10.1V	9.9V
⑨	15.5V	15.7V	0V
⑩	16V	16V	0V
⑪	7.5V	7.5V	7.5V
⑫	0V	0V	16V
⑬	15.5V	0V	0V
⑭	5.2V	5.6V	6.2V
⑮	5.2V	0V	0V
⑯	5.2V	5.6V	6.2V
⑰	5.1V	5.5V	0V
⑱	15.5V	15.7V	0V
⑲	1.3V	1.3V	6.5V
⑳	6.6V	6.6V	6.6V
㉑	0V	0V	16V
㉒	6.6V	6.5V	14.5V
㉓	6.6V	6.6V	6.6V
㉔	16V	16V	0V
㉕	3.1V	10.4V	15.4V
㉖	6.4V	8.8V	10.1V
㉗	6.3V	8.7V	12.2V
㉘	6.3V	8.7V	12.2V
㉙	9.4V	9.4V	12.2V
㉚	1.38V	1.38V	8.6V
㉛	0.32V	0.37V	0.38V
㉜	56V	48V	45V
㉝	TP2003A	24.7V	24.9V
㉞	TP2002A	25.2V	25.4V
㉟			25.6V

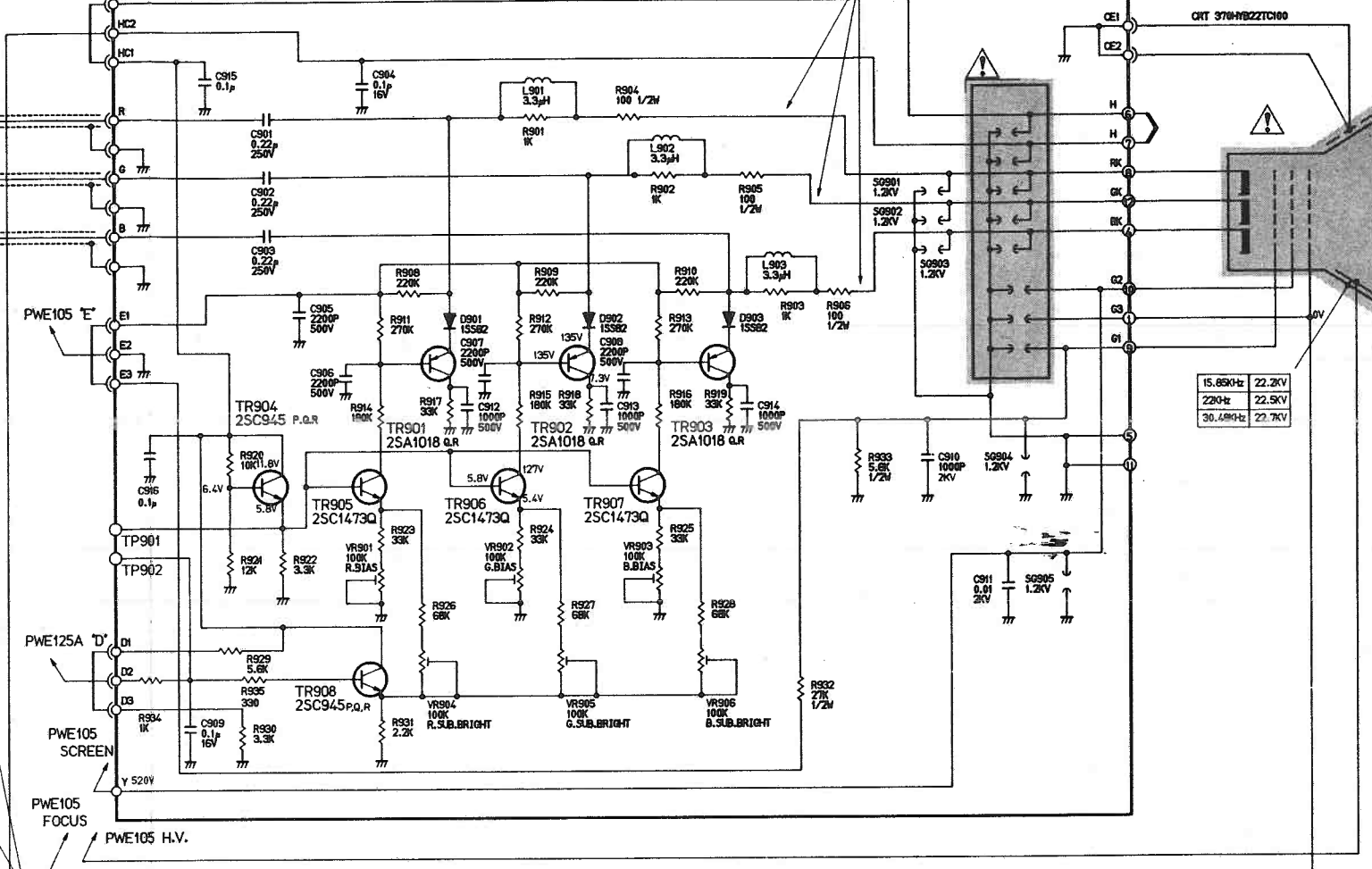




DEO PWB



PWE 123 CRT PWB



IC801				IC802				IC803				IC804			
TEXT	TEXT	SW6	SW6	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT
1	2.0V	4.7V	13	2.5V	0.3V	1	0V	5V	2.1V	4.0V	2.0V	1	0V	5V	2.1V
2	0V	4.7V	14	2.5V		2	1.95V		2.1V	4.0V	2.2V	2	1.95V		2.1V
3	2.0V	4.7V	15	0V		3	2.25V	4.8V	2.1V	4.0V	2.0V	3	2.25V	4.8V	2.1V
4	0V	4.7V	16	0V		4	1.95V		1.95V		2.2V	4	1.95V		1.95V
5	2.0V	4.7V	17	2.5V	0.3V	5	2.25V	4.8V	0V	4.0V	2.0V	5	2.25V	4.8V	0V
6	0V	4.7V	18	2.5V		6	1.95V		2.1V	4.0V	2.2V	6	1.95V		2.1V
7	4.8V	0V	19	0V		7	2.25V	4.8V	0V	0V		7	2.25V	4.8V	0V
8	4.8V	0V	20	0V		8	0V		2.1V	4.0V	2.3V	8	0V		2.1V
9	3.5V	23	2.5V			9	2.25V	4.8V	1.95V	4.0V	2.0V	9	2.25V	4.8V	1.95V
10	0V	24	4.8V			10	1.95V		2.1V	4.0V	2.3V	10	1.95V		2.1V
11	0V					11	2.25V	4.8V	4.8V	0V	4.0V	2.0V	11	2.25V	4.8V
12	0V					12	1.95V		4.8V	4.8V	4.8V		12	1.95V	
						13	2.25V	4.8V	4.8V	0V	4.0V	2.0V	13	2.25V	4.8V
						14	1.95V						14	1.95V	
						15	0V	5V					15	0V	5V
						16	4.8V						16	4.8V	

INPUT VIDEO SIGNAL : TTL, 16 colors, high intensity
all inverted 'H' pattern
H.Sync : 22KHz

NOTES

1. RESISTOR VALUES ARE IN OHMS UNLESS OTHERWISE INDICATED.
2. ALL RESISTORS ARE 1/8WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN PF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLT EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE INVERTED 'H' CHARACTER SIGNAL. THE CONTRAST CONTROL IS MAXIMUM, THE BRIGHTNESS CONTROL IS MINIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC AND VIDEO, EXCEPT WHERE OTHERWISE INDICATED.
SYNC : HORIZONTAL RATE = 15.000KHz, SEPARATE SYNC, TTL LEVEL, POSITIVE VIDEO, TTL LEVEL, POSITIVE
7. (1) HORIZONTAL RATE, (2) VERTICAL RATE.

WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (31) MARKED IS PERMANENTLY FROZEN. DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.